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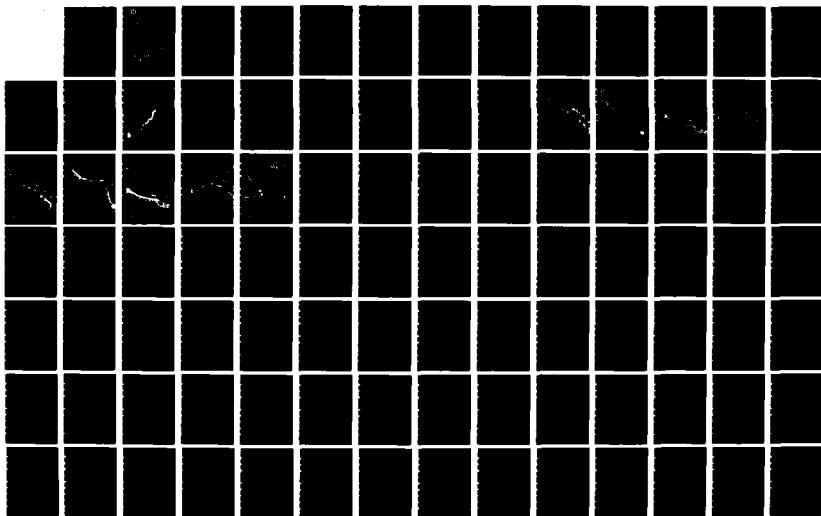
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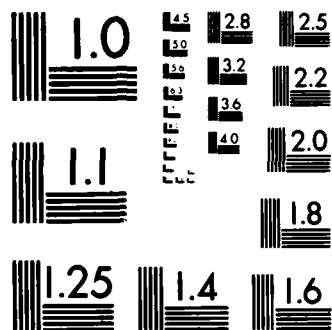
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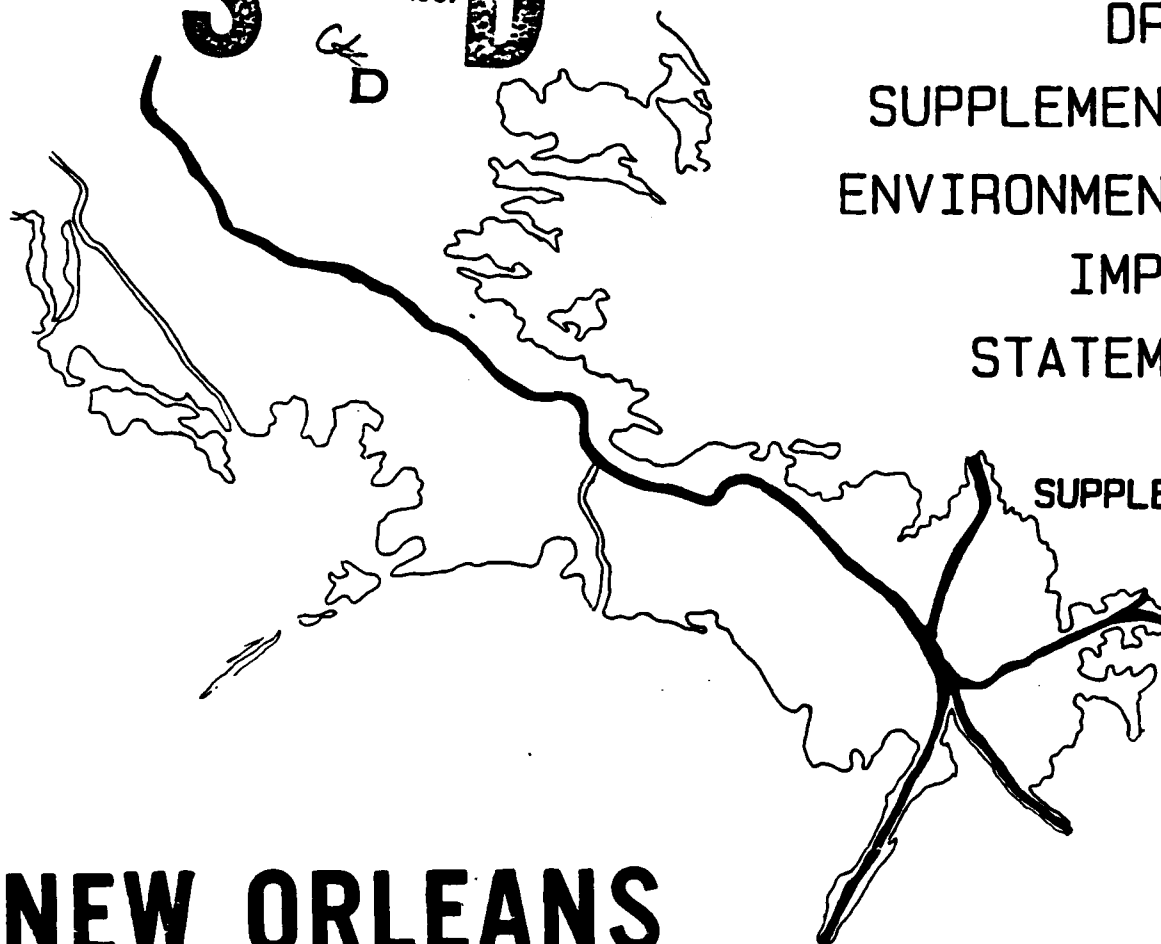
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SUPPLEMENTAL  
ENVIRONMENTAL  
IMPACT  
STATEMENT

SUPPLEMENT  
II

# NEW ORLEANS TO VENICE

LOUISIANA

BARRIER FEATURES

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HURRICANE PROTECTION PROJECT

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FINAL SUPPLEMENTAL  
ENVIRONMENTAL IMPACT STATEMENT

NEW ORLEANS TO VENICE, LOUISIANA  
PLAQUEMINES PARISH

BARRIER FEATURES

**LEAD AGENCY:** U.S. Army Corps of Engineers District,  
New Orleans, Louisiana

**ABSTRACT:** This Supplemental Environmental Impact Statement (Supplement II) has been prepared to examine the environmental impacts associated with the barrier features of the New Orleans to Venice, Louisiana, Hurricane Protection project. The document complements a Final Environmental Impact Statement (FEIS) filed with CEQ January 6, 1975, and a Supplemental FEIS filed with EPA April 12, 1985. Four Environmental Assessments and associated Findings of No Significant Impact have been prepared in conjunction with minor work on other project segments. The purpose of this supplement is to evaluate an environmentally preferable and less costly alternative to the barrier plan presented in the original FEIS.

The project, authorized by Congress in 1962, would provide protection from hurricane induced tidal overflow to the developed area of lower Plaquemines Parish, Louisiana. The protection is to be achieved by increasing the height of existing levees and by modifying current drainage facilities. Construction began in 1966 and will be completed by 2013.

The barrier feature alternatives would provide protection from easterly storms striking the developed areas of the parish between City Price and Venice. Five alternatives were initially considered and three plans, West-bank River Levee, East-bank Barrier Levee, and No-Action, were retained for evaluation. The West-bank River Levee would involve the enlargement of the existing Mississippi River and Tributaries levee to hurricane grade from City Price to Venice, Louisiana, and the East-bank Barrier Levee would consist of a barrier levee along the east bank of the Mississippi River from Bohemia, Louisiana, to Baptiste Collette Bayou. The No-Action plan would be synonymous with the future-without-project conditions. The West-bank River Levee plan has been recommended because it addresses the identified public concerns, makes a net positive contribution to the goal of National Economic Development, and reduces environmental consequences.

**Date:** September 30, 1987

Send your comments to the District Engineer, ATTN: CEIMN-PD-RE by the date stamped above. for further information, you may contact Mr. E. Scott Clark, U.S. Army Engineer District, New Orleans, P.O. Box 60267, New Orleans, Louisiana 70160-0267; telephone (504) 862-2521.

## 1. SUMMARY

### 1.1. MAJOR CONCLUSIONS AND FINDINGS

1.1.1. The purpose of this document (Supplement II) is to address the environmental impacts associated with the barrier features of the New Orleans to Venice, Louisiana, Hurricane Protection project. The report complements a Final Environmental Impact Statement (FEIS) filed with the Council on Environmental Quality January 6, 1975, and a supplemental FEIS addressing back-levee work and mitigation, which was filed with the Environmental Protection Agency April 12, 1985. The 1975 FEIS evaluated the construction of a barrier levee from Bohemia, Louisiana, to 10 miles above the Head of Passes on the east bank of the Mississippi River and from Fort Jackson to Venice on the west bank. Since that time, environmentally preferable and less costly alternatives to these alignments have been evaluated and are examined in this document. Four Environmental Assessments (EA) and Findings of No Significant Impact (FONSI) have been prepared to evaluate the impacts of additional minor work on other segments of the project. These documents were the Reach B-1, Alternative Borrow Site, March 1986; Reach C Levee Enlargement, Borrow Site (Pointe-a-la-Hache), April 1986; Reach C Levee Enlargement, Borrow Site (Poverty Point and Pointe-a-la-Hache), December 1986; and Reach C Levee Enlargement, Davant Borrow Site, June 1987.

1.1.2. In 1962, Public Law 874, 87th Congress authorized the project, "Mississippi River Delta at and below New Orleans to Venice, Louisiana." The project would prevent hurricane-induced tidal damages along the Mississippi River in lower Plaquemines Parish, Louisiana, by increasing the height of the existing back levees, altering the existing drainage facilities and modifying the main river levee, as necessary. Construction of a back levee on the east bank from Phoenix to Bohemia, Louisiana, began in 1966, and construction of a back levee on the west bank from Tropical Bend to Venice, Louisiana, began in 1968. Construction of the remaining back levee on the west bank from City Price to Tropical Bend has not

This draft report should be processed by DTIC. The final version will not be published in six months or more.  
Per Mr. William C. Wilson, Army Corps of Engineers, New Orleans District

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begun. The barrier levee alternatives would protect the west bank area between City Price and Venice from storms coming from the east.

1.1.3. The East-bank Barrier Levee (EBBL) alternative consists of a barrier levee along the east bank of the Mississippi River from near Bohemia, Louisiana, to an area opposite Venice, Louisiana. In addition, this alternative includes an enlarged Mississippi River and Tributaries (MR&T) levee on the west bank of the Mississippi River from Fort Jackson to Venice, Louisiana.

1.1.4. The West-bank River Levee (WBRL) alternative involves an enlargement of the existing MR&T levee to hurricane grade from City Price to Venice, Louisiana. In reaches where stability conditions do not permit an enlarged levee, a levee setback or floodwall is proposed.

1.1.5. The WBRL plan is the National Economic Development (NED) plan. This alternative would provide maximum benefits to the residents and property of the developed areas of the parish, and would yield the maximum average annual excess benefits over costs. First cost of this plan is about \$84 million. The total project is estimated to cost about \$255 million with a benefit to cost ratio of 1.7 to 1, based on residual benefits and the authorized project interest rate.

1.1.6. The WBRL plan is also the least environmentally damaging plan. Implementation of this alternative would result in the loss of 772 acres of batture woodlands and 13 acres of remnant, enclosed levee forest and would temporarily disrupt 237 acres of cleared/developed land, 453 acres of existing levee, and 581 acres of Mississippi River bottoms. Because of the extensive wetlands in the project area, there are no practicable alternatives to locating some project features of the recommended plan in these areas. Most of the sensitive levee forest sites within the proposed borrow sites were deleted during the planning process. Most of the batture woodlands are pure willow stands. Significant environmental impacts would be mitigated.

1.1.7. The previously selected East-bank Barrier Levee plan is estimated to cost \$92 million, about \$8 million more than the WBRL plan. Environmental impacts are also considerably greater. The project would result in the direct loss of about 311 acres of batture woodlands, 10 acres of shallow estuarine water and 617 acres of marsh; it would also affect 69 acres of cleared/developed land and 125 acres of existing levee. Implementation of this plan would levee off one of the few remaining natural alluvial ridges along the Mississippi River. The levee would also prevent the natural deltaic processes of freshwater overflow and land accretion adjacent to the Mississippi River. At least 30,000 acres of wetlands could be indirectly impacted. To compensate for some of the environmental impacts, five fresh water diversion structures would be installed in the levee.

1.1.8. The WBRL plan is the Tentatively Selected Plan (TSP), because it best addresses the National Economic Development and is the Least Environmentally Damaging alternative.

## **1.2. AREAS OF CONTROVERSY AND UNRESOLVED ISSUES**

On March 18, 1986, a scoping meeting was held in Buras, Louisiana, to obtain public input into the identification of significant issues to be evaluated in the EIS. Major areas of concern included the Corps' determination of a 100-year storm, wetland impacts, flood insurance matters relating to the Federal Emergency Management Agency (FEMA), and rights-of-way requirements. At that time, the EBBL plan was the Tentatively Selected Plan, and a number of comments concerned the environmental impacts of the EBBL to surrounding wetlands. The availability and cost of flood insurance required by FEMA are perhaps the most important issues to the local populace, and one over which the Corps has little control.

## **1.3. RELATIONSHIP OF PLAN TO ENVIRONMENTAL REQUIREMENTS**

1.3.1. In addition to compliance with the National Environmental Policy Act, the Corps must adhere to other Federal and state environmental

protection statutes and requirements (Table 1.3). The U.S. Fish and Wildlife Service's Fish and Wildlife Coordination Act Report can be found in Appendix A, a Section 404(b)(1) evaluation required by the Clean Water Act in Appendix B, and a Biological Assessment of Threatened and Endangered Species in Appendix C. A Consistency Determination related to the Louisiana Coastal Resources Program - Coastal Use Guidelines is not required as the impacts of the FSP are within batture or upland areas. Coordination of the alternatives with the Soil Conservation Service under the Farmland Protection Policy Act can be found in Appendix D.

1.3.2. Project features of the WBRL plan were evaluated with respect to Section 404(b)(1) Guidelines of the Clean Water Act for Specification of Disposal Sites for Dredge or Fill Material, published 24 December 1980 by the U.S. Environmental Protection Agency. A state Water Quality Certificate was applied for on June 16, 1987. About 151 acres of waters or wetlands (147 acres of willow batture woodlands and 4 acres of the Mississippi River) would have bucket-dredged material placed on them. Water quality changes during construction would not result in significant adverse effects on human health and welfare, including municipal and private water supplies, recreational and commercial fishing, plankton, fish, shellfish, wildlife, and special aquatic sites. Adverse effects on the life stages of aquatic and terrestrial organisms would be minimal. Significant adverse effects on aquatic ecosystem diversity, productivity and stability, and recreational, esthetic, and economic values would not occur. During construction, short-term releases which exceed the Louisiana State Water Quality Standards could be evident; however, no long-term or significant problems would occur.

1.3.3. Executive Order (E.O.) 11990, Protection of Wetlands, recognizes the significant value of wetlands. The WBRL plan would minimize the wetland impacts and would provide maximum benefits and protection at minimal cost. With the exception of 9 acres of cottonwood/sycamore habitat, the remaining wetland impacts are all in willow-dominated batture lands. The EBBL plan would directly impact 938 acres of wetland and indirectly affect at least 30,000 more.



TABLE 1.3

RELATIONSHIP OF PLANS TO ENVIRONMENTAL PROTECTION  
STATUTES OR OTHER ENVIRONMENTAL REQUIREMENTS

	ALTERNATIVES	
	WBRL	EBBL
<u>FEDERAL STATUTES</u>		
Preservation of Historical Archeological Data Act of 1974	PC <u>1</u> /	PC
Clean Air Act, as Amended	PC <u>2</u> /	PC
Clean Water Act of 1977	PC <u>3</u> /	PC
Coastal Zone Management Act of 1972, as Amended	N/A <u>4</u> /	PC
Endangered Species Act of 1973, as Amended	FC	FC
Estuary Protection Policy Act	N/A	PC
Farmland Protection Act	FC	FC
Federal Water Project Recreation Act	FC	FC
Fish and Wildlife Coordination Act	FC	FC
Land and Water Conservation Fund Act	FC	FC
Marine Protection, Research and Sanctuaries Act of 1972, as Amended	N/A <u>6</u> /	N/A
National Historic Preservation Act	PC <u>1</u> /	PC
National Environmental Policy Act	PC <u>7</u> /	PC
River and Harbor Act	N/A <u>8</u> /	N/A
Water Resources Development Act of 1986	FC	FC
Watershed Protection and Flood Prevention Act	N/A <u>8</u> /	N/A
Wild and Scenic Rivers Act	PC <u>5</u> /	PC
<u>EXECUTIVE ORDERS</u>		
Executive Order 11988, Floodplain Management	FC	FC
Executive Order 11990, Protection of Wetlands	FC	FC
Executive Memorandum, Analysis of Impacts on Prime or Unique Farmlands in Implementing NEPA	FC	FC
Executive Order 11593, Protection and Enhancement of the Cultural Environment	PC <u>1</u> /	PC
Executive Order 12372, Intergovernmental Review of Federal Programs	PC <u>9</u> /	PC

TABLE 1.3 (Cont'd)

RELATIONSHIP OF PLANS TO ENVIRONMENTAL PROTECTION  
STATUTES OR OTHER ENVIRONMENTAL REQUIREMENTS

	ALTERNATIVES	
	WBRL	EBBL
<u>STATE AND LOCAL POLICIES</u>		
Air Control Law	PC <u>2/</u>	PC <u>2/</u>
Protection of Cypress Trees (EO 1980-3)	FC	FC
Water Control Law	PC <u>3/</u>	PC <u>3/</u>
<u>LAND USE PLAN</u>		
Louisiana Coastal Zone Management Plan	N/A <u>4/</u>	PC <u>4/</u>
<u>REQUIRED FEDERAL ENTITLEMENTS</u>		
None are required.		
FC = Full compliance                      PC = Partial compliance                      N/A = Not applicable		

- 1/ The New Orleans District is developing two cultural resources management plans, which include Plaquemines Parish. Both plans are expected to be operational in early 1988, after a Memorandum of Agreement is signed by the Corps, State Historic Preservation Office, and Advisory Council on Historic Preservation. The plans should result in no effect, no adverse effect determinations, will complete cultural resource requirements, and will lead to full compliance. The Corps is developing a Research Design for Fort St. Philip and Fort Jackson, both National Historic Landmarks, which, when implemented, would assess physical impacts and possible mitigation requirements. This would result in a no effect, no adverse effect determination.
- 2/ Compliance is achieved by distribution of this DEIS to the Environmental Protection Agency (EPA).
- 3/ A State of Louisiana Water Quality Certificate for the WBRL plan was applied for on June 16, 1987. No state Water Quality Certificate was applied for on the EBBL plan.
- 4/ As indicated in a letter dated April 19, 1984, work riverside of the flood levees does not require a Coastal Zone Management Consistency Determination. A Consistency Determination would be necessary for the EBBL alternative, but has not been prepared because this plan has not been tentatively selected.
- 5/ Review of this document by the Department of the Interior will bring this action into compliance.
- 6/ No dumping of dredged material into the ocean is involved.
- 7/ Review of the DEIS and FEIS, and signing the Record of Decision, will result in full compliance.
- 8/ No requirements for Congressionally authorized projects.
- 9/ Review of this document will result in compliance.

1.3.4. Executive Order 11988, Flood Plain Management, recognizes the significant value of floodplains. The areas along the east side of the Mississippi River still function as a natural floodplain system and would not be significantly altered by the proposed WBRL. The EBBL plan would affect the flood plain of the east side. The flood plain on the west side of the Mississippi River is already isolated as a result of existing hurricane protection levees and river-training levees.

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### **3. NEED FOR AND OBJECTIVES OF ACTION**

#### **3.1. STUDY AUTHORITY**

The New Orleans to Venice Hurricane Protection project, formerly entitled Mississippi River Delta at and below New Orleans, was authorized by Public Law 874, 87th Congress, 2nd Session, approved October 23, 1962, in accordance with recommendations of the Chief of Engineers' In-House Document No. 550, 87th Congress, 2nd Session. The general area of the project includes the delta portion of the Mississippi River south of New Orleans.

Authorizing reports and hearings indicated authority existed to modify the main line river levees, or to construct an alternate thereto, to accomplish the purpose of the hurricane protection project. The improvements would provide protection against tides of 100-year frequency, but would not provide complete protection from tidal flooding. In 1969, two plans were presented to higher authority to provide the necessary protection. These plans consisted of raising the Mississippi River levee on the west bank to an appropriate grade or constructing a barrier levee on the east bank of the river. At that time, the east-bank barrier levee (EBBL) was found to be most economically feasible. Preparation of a general design memorandum was approved in July 1970. In 1985, a restudy of these alternative indicated the west-bank river levee, (WBRL) plan was more feasible from an economical and environmental perspective. A general design memorandum for the WBRL was approved in July 1986.

#### **3.2. PUBLIC CONCERNS**

Public concerns for this project involve the reduction of flood losses due to hurricanes. The inundation of the developed areas creates hazards to life, damages public and private property, disrupts community and business life, and requires extensive expenditures of private and public funds for evacuation and rehabilitation activities. The loss of wetlands

and potential effects on plant and animal life are environmental issues. The project impacts on commercially important shellfish, finfish, and mammals are of concern.

During the scoping process, concern was expressed over numerous issues; however, the impacts associated with implementation of the EBBL feature dominated. Concerns of particular interest included: wetland loss, reduction in freshwater overflow, construction schedule, 100-year storm definition, flood insurance, rights-of-way acquisition, and alternatives. The concerns raised, but not normally evaluated in an EIS, were addressed in a scoping document, distributed to the general public September 26, 1986.

### **3.3. PLANNING OBJECTIVES**

3.3.1. The following planning objectives were established in response to the economic, biological, cultural, and recreational needs of the area: provide hurricane protection to the residents and prevent losses due to flooding; preserve the cultural heritage; prevent the loss of recreational potential; preserve, enhance, and create as much marsh as practical; and protect the flora and fauna of the study area.

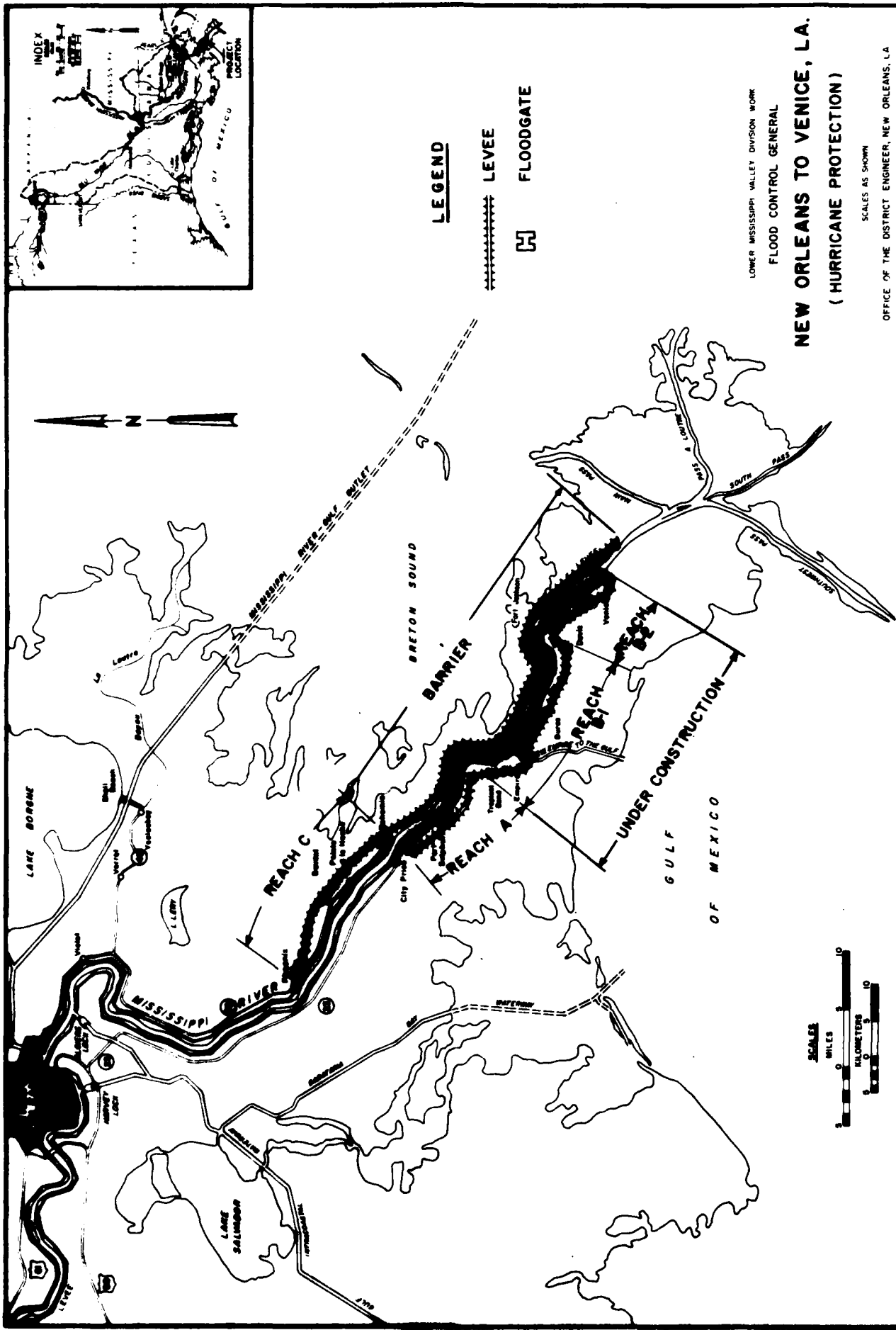
3.3.2. This report is prepared in accordance with the National Environmental Policy Act of 1969 and utilizes a systematic, interdisciplinary approach. This document discusses the environmental concerns examined while developing a means to provide the necessary hurricane protection and to reduce environmental impacts as much as practicable. The following sections include a discussion of the alternatives, environment to be affected, significant resources, and impacts of the various alternatives on the significant resources.

### 3.4. PROJECT DESCRIPTION

Plaquemine Parish stretches along both banks of the Mississippi River south of New Orleans, Louisiana. The natural alluvial ridge of the Mississippi is developed on the west bank south to Venice, but only as far as Bohemia on the east bank. Federally built levees immediately adjacent to the river protect these developed areas from Mississippi River flooding. South of Bohemia on the east bank, there are only low, eroding, locally built levees that are breached in several places. Low-lying marshes stretch from the inhabited ridge to Breton Sound, Barataria Bay, or the Gulf of Mexico. Protection from hurricane-induced tidal overflow coming from the west can be achieved by construction of back levees at the edge of the alluvial ridge. Protection of the area from City Price to Venice on the west bank from hurricane-induced surges coming from the east can be achieved in two ways: either constructing a barrier levee on the east bank of the river from Bohemia to Baptiste Colette Bayou or raising the Mississippi River levee on the west bank from City Price to Venice to provide protection.

The project, which was started in 1966, is intended to provide hurricane protection to the developed areas of Plaquemines Parish along the Mississippi River below New Orleans, Louisiana. The total plan involves the enlargement of the locally constructed back levee from City Price to Venice on the west bank (Reach A, B-1, and B-2), bringing the existing levee from Phoenix to Bohemia up to grade on the east bank (Reach C), and raising about 34 miles of levee along the river from the vicinity of Bohemia south to an area near Venice. The west bank portion of the project from Tropical Bend south to Venice (Reaches B-1 and B-2) is currently under construction by a sand core, hydraulic clay method, while work from Tropical Bend north to City Price (Reach A) has not begun. The Reach C section requires upgrading (Figure 3.4.1). Several alternative levee alignments along the river are herein examined to provide protection from storms striking the area from Breton Sound.





#### **4. ALTERNATIVES**

##### **4.1. PLANS ELIMINATED FROM FURTHER STUDY**

4.1.1. Two plans, a semicompacted, east-bank barrier levee plan and a nonstructural plan, were considered in the preliminary stages of planning, but were later rejected.

4.1.2. East-bank, Semicompacted Fill Plan. This plan called for a semi-compacted fill levee on the east bank of the Mississippi River from the vicinity of Bohemia to Venice, Louisiana. Fill material would be cast into the levee area, diked, and allowed to dry. About 12 inches of this dried material would be placed onto the levee section, and compacted in place prior to the addition of successive layers. With this plan about 5.5 million cubic yards of in-place material would be required. The use of a semicompacted levee would cost about \$100 million, \$8 million more than an uncompacted levee.

4.1.3. Nonstructural alternatives, such as evacuation, would result in inadequate protection for parish property.

##### **4.2. WITHOUT CONDITIONS**

4.2.1. If no Federal action is taken to address the planning objectives, the present Mississippi River and Tributaries (MR&T) levee would be easily overtopped during a hurricane surge coming from the east and the developed area would be subject to inundation. The existing levee provides protection from a 20-year storm event.

4.2.2. Land losses in the Mississippi Deltaic Plain region have been estimated to be about 200,000 acres per year (Fruge, 1981). Based on Wicker (1980), losses in Breton Sound between 1956 and 1978 were about one percent per year. Although coastal areas are subject to alteration through the natural process of deposition, subsidence, and erosion, activities such as dredging canals, altering sediment transport, and reclaiming land have

greatly accelerated wetland losses. These activities have resulted in negative impacts such as saltwater intrusion, eutrophication, reduction of storm-buffering capacity, loss of natural waste treatment, and decline of nursery grounds for fish and shellfish. Because of the Mississippi River levees, the historical depositional mechanism of the river is no longer effective in most areas. Erosion, subsidence, and a general relative sea level rise are resulting in considerable marsh loss as the land slowly recedes into estuarine water bodies. The character of the marsh is not only changing as a result of subsidence, but salinity increases are modifying existing vegetation patterns and the distribution of valuable shellfish, fish, and furbearers.

#### 4.3. PLANS CONSIDERED IN DETAIL

4.3.1. The following two plans are the most feasible alternatives for providing the required hurricane surge protection.

4.3.2. The West-bank River Levee (West-bank) Plan (WBRL) involves raising the existing MR&T levee to the hurricane protection elevation 17.0 NGVD from City Price, Louisiana, (River Mile 44) to Fort Jackson (River Mile 20) and 16.0 feet NGVD from Fort Jackson to Venice (Mile 10). This represents an increase of grade of approximately 6 inches in the upper sections to a 3-foot increase in the lower portions. A 0- to 120-foot uncompacted fill stability berm would be constructed landside of the levee, where required, and a 45- to 55-foot uncompacted fill wave berm would be constructed throughout the project on the river side of the levee. This wave berm would be armored with about 100,000 cubic yards of shell and 500,000 tons of rip-rap. Where possible, the landside toe of the new levee would coincide with the existing MR&T levee toe. In these sections where stability conditions do not permit the use of the existing MR&T alignment, levee setbacks or floodwalls would be used to provide the necessary protection. The levee and associated berms would be constructed with about 6.2 million cubic yards of fill. To obtain the necessary fill, about 19 million cubic yards of material would have to be removed from about

800 acres of batture area on the east side of the river. In areas where the west-side batture exceeds 200 feet, a 60-foot-wide flotation channel would be constructed adjacent to, and riverside of, the levee to allow the placement of fill material. Material removed from the channel would be placed in the berm or levee. Operation and maintenance (O&M) would consist of grass mowing, levee road repair, and rock, shell and other armor replacement. Minor levee and berm repair may be required due to hurricane damage, river changes, or other erosive forces. Most activities would be performed within the existing Mississippi River and Tributaries O&M authority. The cost of this plan is \$84 million.

4.3.3. The East-bank Barrier Levee (East-bank) Plan (EBBL) consists of a levee constructed along the east bank of the Mississippi River from River Mile 44 Above Head of Passes (AHP) near Bohemia, Louisiana, to River Mile 10 AHP near Venice, Louisiana, and an enlarged Mississippi River and Tributaries (MR&T) levee on the west bank of the Mississippi River from Fort Jackson to Venice, Louisiana. The east-bank levee would be constructed with about 8 million cubic yards of uncompacted fill material removed from a 150-foot-wide by -20-foot-deep opposite borrow pit, and cast directly onto a 150- to 200-foot-wide levee and berm section to a final design elevation of 15.8 feet National Geodetic Vertical Datum (NGVD) near Bohemia to 14.6 feet near Venice. About 400,000 cubic yards of shell and 1.3 million tons of rip-rap are necessary for slope and foreshore protection. The west bank levee would be upgraded within the existing MR&T rights-of-way with 350,000 cubic yards of semicompacted fill to an elevation of 13 to 15 feet. For this work, about one million cubic yards of material would be obtained from a 50-acre batture area borrow pit on the east side of the river. Operation and maintenance (O&M) would consist of grass mowing, levee road repair, and rock, shell and other armor replacement. Minor levee and berm repair may be required due to hurricane damage, river changes, or other erosive forces. The water diversion structures would require periodic operation and maintenance. The diversion channels would require occasional dredging. The cost of this plan is about \$92 million.

4.3.4. The WBRL plan has been designated as the National Economic Development plan and is the Tentatively Selected Plan (TSP). The cost to benefit ratios for the plans are summarized in Table 4.3.1.

4.3.5. A key map of the project area can be found on Figure 4.3.1. Detailed maps of the impacted areas and levee alignments for the WBRL can be found in Figure 4.3.2. (A-E) and for the EBBL in Figure 4.3.3. (A-E).

#### **4.4. FISH AND WILDLIFE MITIGATION**

4.4.1. Mitigation for the entire New Orleans to Venice Hurricane project involves two mitigation plans: one for impacts induced as a result of work on the back protection levees (Reaches A and B), and the other for impacts caused by upgrading an east-bank, back levee (Reach C) and the barrier feature. The impacts associated with implementation of the Reach A and B levees were addressed in the 1985 Final EIS and accompanying mitigation report.

4.4.2. Mitigation for the A and B reaches is currently being implemented with one delta splay having been constructed on the Delta National Wildlife Refuge and several more scheduled. Mitigation would be required with implementation of either the WBRL or EBBL plan. The basis for mitigation requirements was the Habitat Evaluation Procedure (HEP), conducted by representatives of the Corps, U.S. Fish and Wildlife Service, and the Louisiana Department of Wildlife and Fisheries, with details contained in the Fish and Wildlife Coordination Act Report (FWCAR) found in Appendix A.

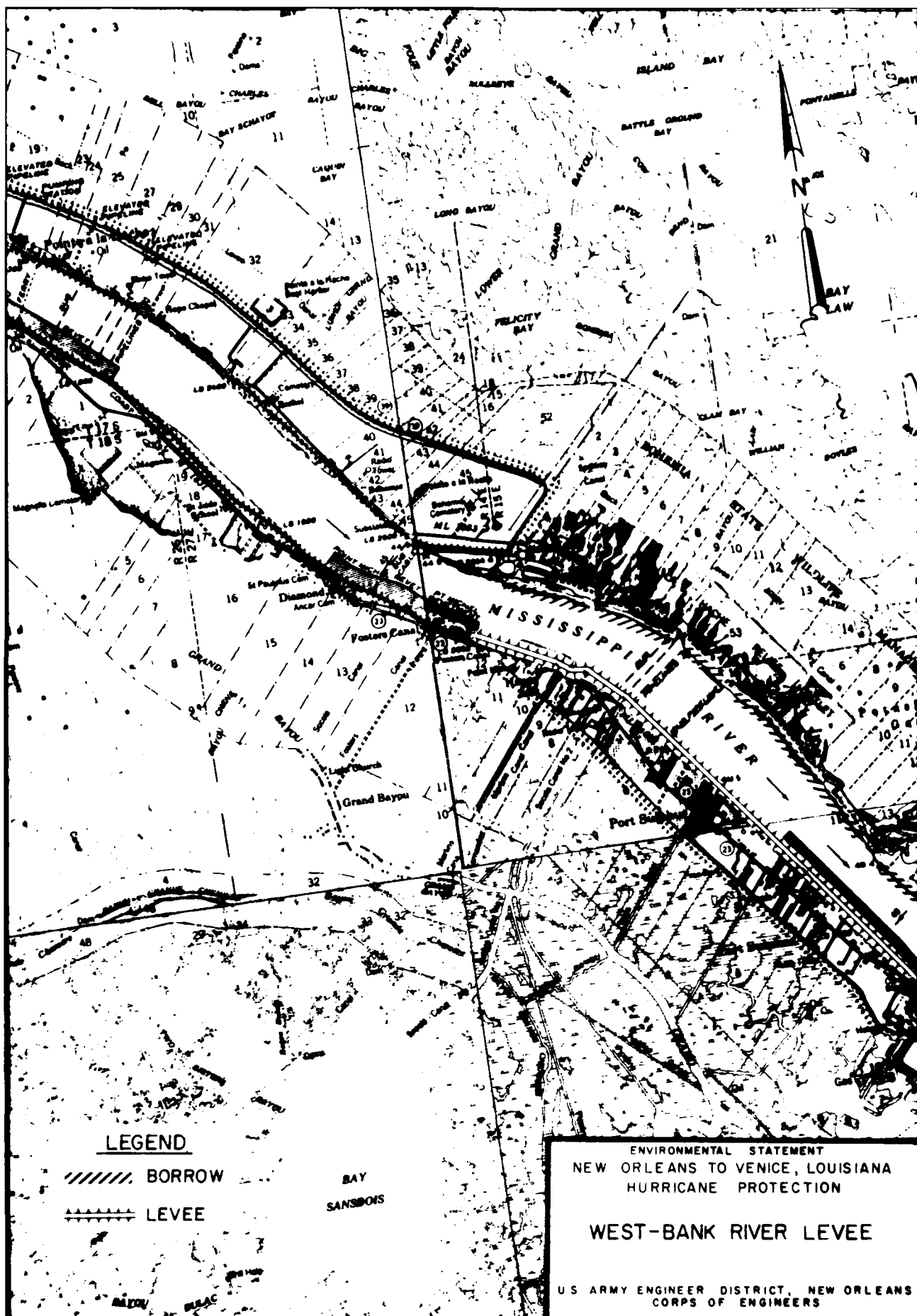
4.4.3. Mitigation alternatives for the WBRL plan are still in the formulation stage. A separate mitigation report is being prepared to assess compensation for environmental impacts associated with the WBRL and Reach C construction. Mitigation concepts involve the use of weirs, dikes, levees, or plugs to retard saltwater intrusion, breaching natural levees along passes to create marsh by a delta-splay technique, obtaining non-development easements on a tract(s) of secondary levee forest, and

TABLE 4.3.1  
REMAINING COST TO REMAINING BENEFIT RATIO<sup>a/</sup>  
NEW ORLEANS TO VENICE, LOUISIANA, HURRICANE PROTECTION PROJECT  
(1986 prices, 1993 base year, 100-year project life)

	WEST-BANK RIVER LEVEE		EAST-BANK BARRIER LEVEE	
	2-7/8% Interest (x \$1,000)	8-7/8% Interest (x \$1,000)	2-7/8% Interest (x \$1,000)	8-7/8% Interest (x \$1,000)
<b>FIRST COSTS</b>				
PROJECT COST				
Construction Cost	\$254,651,000	\$254,651,000	\$262,651,000	\$262,651,000
Remaining Construction Cost	\$186,148,000	\$186,148,000	\$181,791,000	\$181,791,000
Remaining Present Worth	\$171,078,000	\$157,659,000	\$167,483,000	\$155,096,000
Mitigation Construction Cost	\$ 643,000	\$ 643,000	\$ 16,066,000	\$ 16,066,000
Mitigation Present Worth	\$ 506,000	\$ 511,000	\$ 17,553,000	\$ 21,333,000
<b>AVERAGE ANNUAL COSTS</b>				
HURRICANE PROTECTION FEATURE				
Interest/Amortization	\$ 5,225,000	\$ 13,995,000	\$ 5,115,000	\$ 13,768,000
Operation/Maintenance	\$ 241,000	\$ 241,000	\$ 241,000	\$ 241,000
Replacements	\$ 88,000	\$ 78,000	\$ 88,000	\$ 78,000
Fish and Wildlife Losses	\$ 18,000	\$ 17,000	\$ 2,244,000	\$ 1,152,000
MITIGATION FEATURE				
Interest/Amortization	\$ 15,000	\$ 45,000	\$ 536,000	\$ 1,894,000
Operation/Maintenance	\$ 34,000	\$ 33,000	\$ 334,000	\$ 333,000
Replacements	-	-	\$ 346,000	\$ 104,000
TOTAL AVERAGE ANNUAL CHARGES	\$ 5,621,000	\$ 14,409,000	\$ 8,904,000	\$ 17,570,000
<b>AVERAGE ANNUAL BENIFITS</b>				
HURRICANE PROTECTION FEATURE				
Flood Control	\$ 9,619,000	\$ 9,233,000	\$ 9,619,000	\$ 9,233,000
MITIGATION FEATURE				
Fish and Wildlife Gains	\$ 13,000	\$ 12,000	\$ 1,133,000	\$ 587,000
TOTAL AVERAGE ANNUAL BENEFITS	\$ 9,632,000	\$ 9,020,000	\$ 10,752,000	\$ 9,820,000
<b>BENEFIT / COST RATIO</b>				
BENEFIT/COST RATIO	1.7	0.64	1.2	0.56

<sup>a/</sup> Costs shown are for the entire hurricane protection project, excluding Reach C.

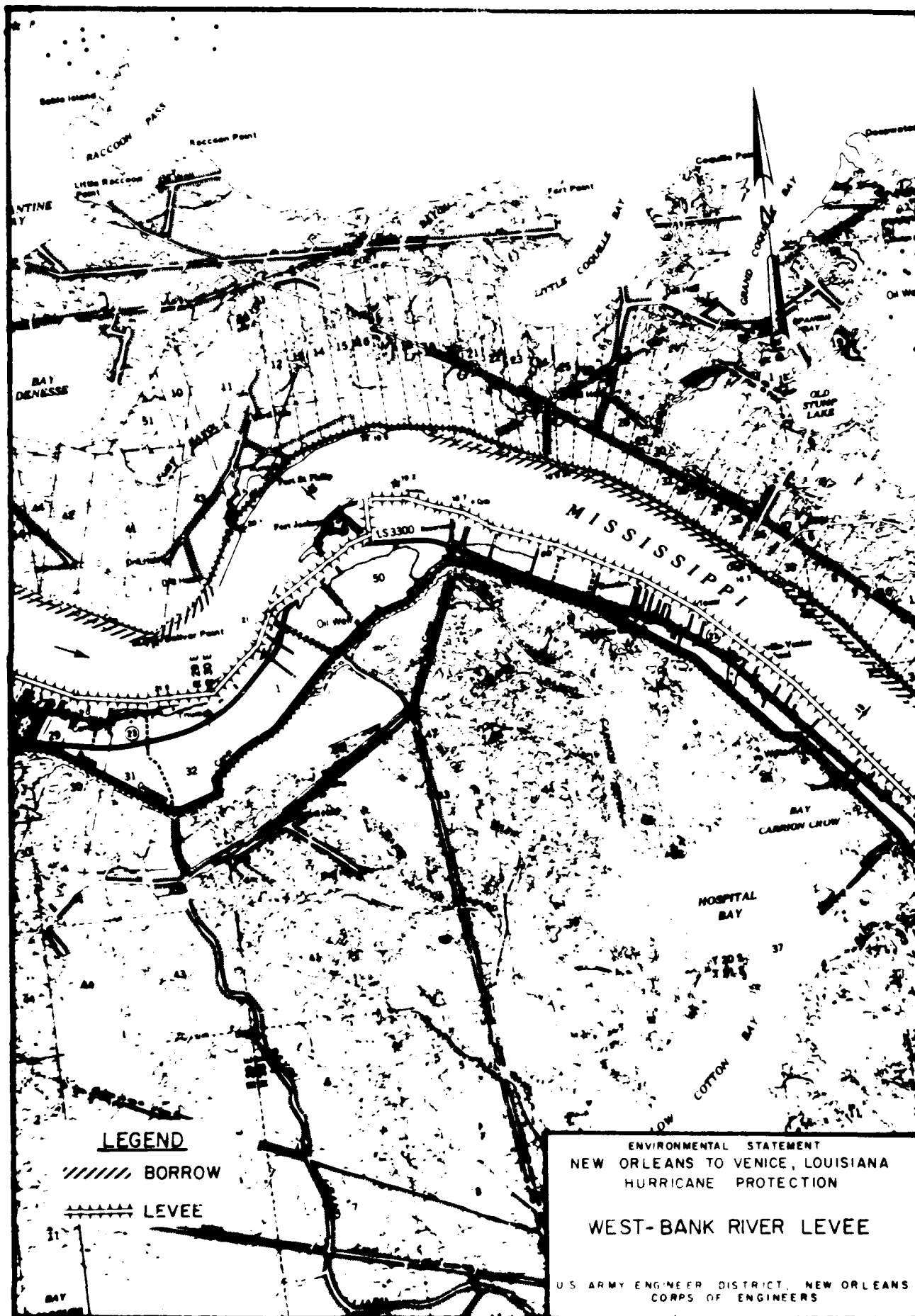








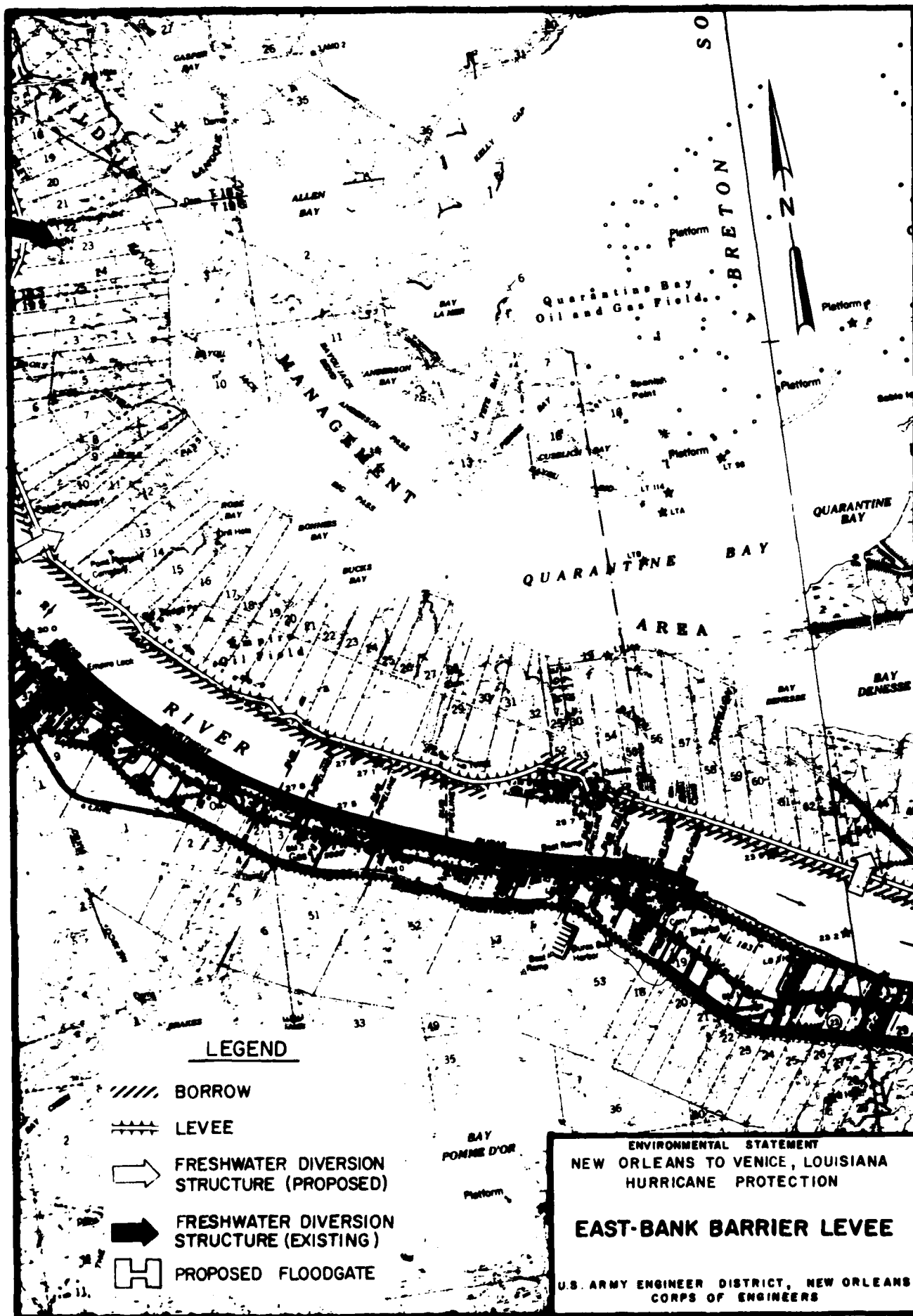


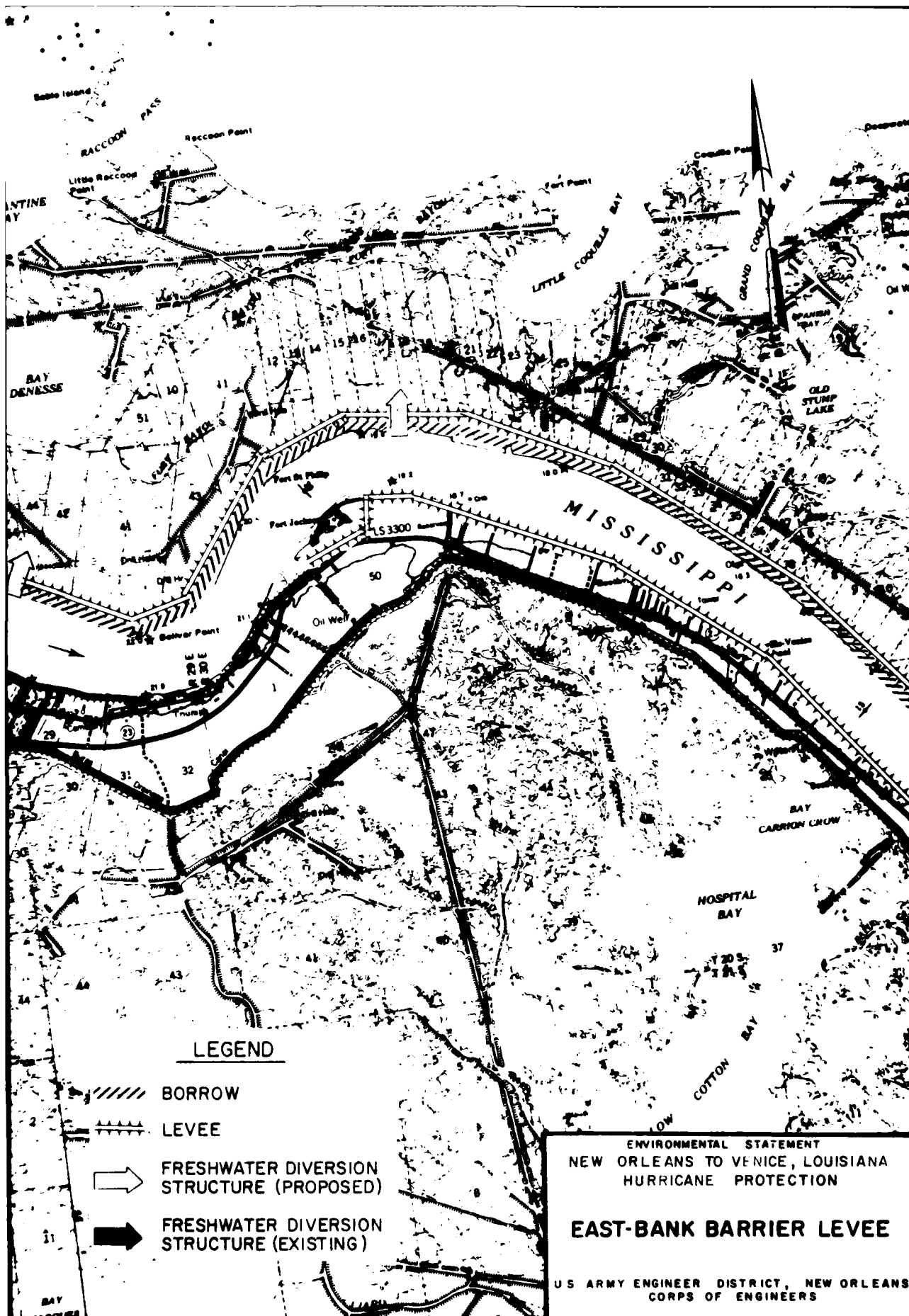




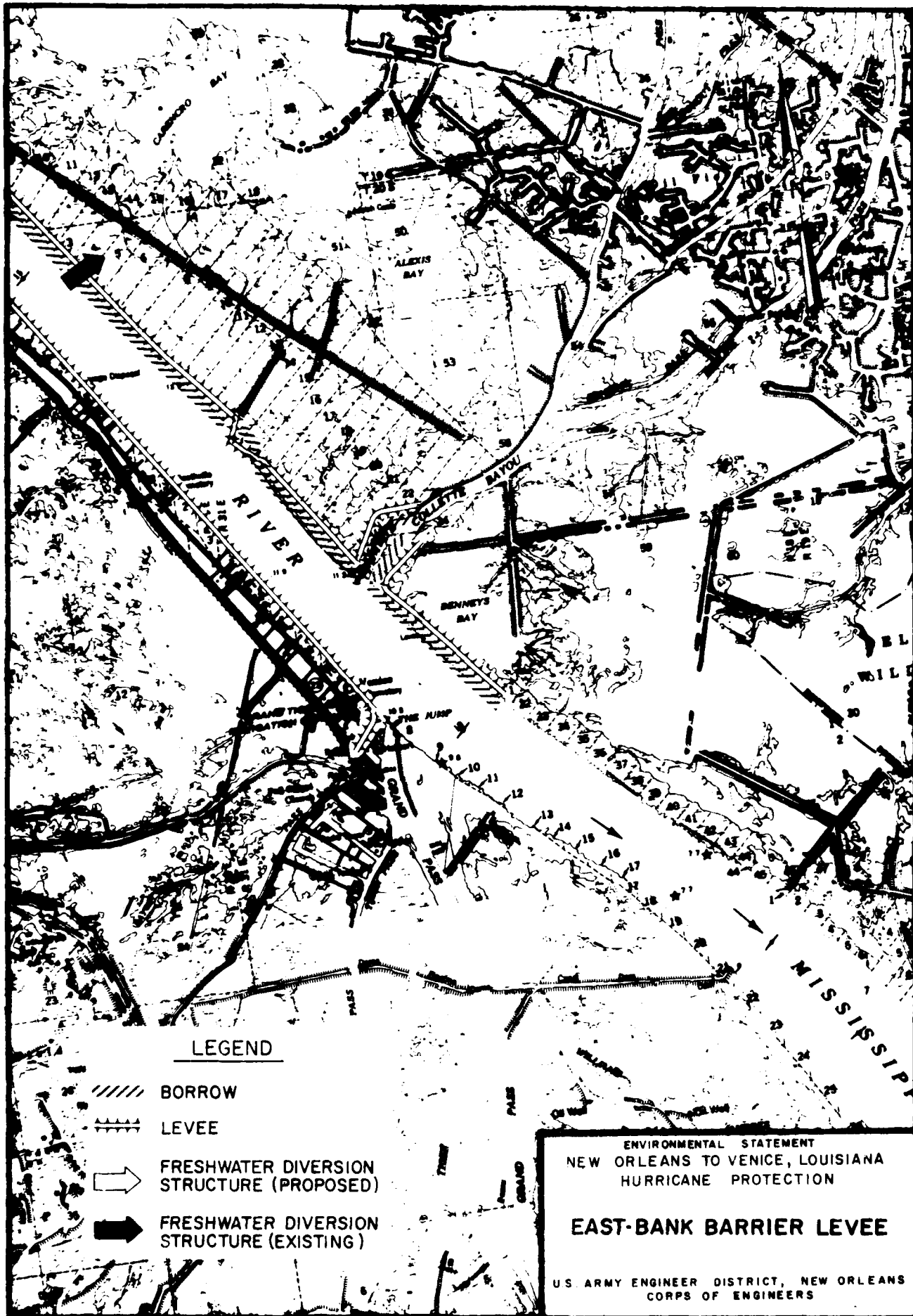












planting bottomland hardwood tree species on low habitat quality lands. The alternatives under consideration are briefly described below.

Water control structures in conjunction with dikes, levees, or plugs could be used to retard saltwater movement into an area of about 1,000 acres of marsh west of Lake Judge Perez, a 300-acre shallow open water area south of Myrtle Grove (Ollie Canal), and/or a 400-acre open water area southeast of the Buras Marina.

A natural marsh creation project could be implemented on distributaries of the Mississippi River. Marsh would be created by opening holes in the southern natural levee along Main Pass, Baptiste Collette Bayou, or Pass-a-Loutre and allowing sediment-rich river waters to enter the shallow water areas. The result would be gradual development of small delta splays on which natural fresh marsh could be established.

Easements could be obtained or fee title purchase made on one large or several small tracts of land to preserve the rapidly disappearing natural alluvial forest within the protected area. An approximately 100-acre tract of land south of and contiguous with the Fort Jackson Park would be the preferable area. Preservation credits and Congressional authorization would be necessary to implement this alternative. Preservation credits are provided for in areas of rapid development where the proposed mitigation site has a high probability of being cleared or destroyed during the project life.

High wildlife value plants native to the natural alluvial ridge could be planted on open lands. Tree species considered for use include cypress, sweet pecan, and several species of oak and magnolia. Shrub species would include wax myrtle, button bush, Virginia "willow," and several species of holly and haw.

4.4.4. Implementation of the EBBL plan instead of the tentatively selected WBRL plan would entail not only mitigation of the direct impacts due to

levee construction and borrow removal, but also mitigation of the indirect impacts of fresh water and sediment losses. To minimize mitigation requirements, environmental measures that would improve fish and wildlife use of the borrow sites would be incorporated. These would include the dredging of the borrow pit to an appropriate size, depth, shape and structure, vegetating the sides, and placing cover (Aggus and Ploskey, 1986). Mitigation of the direct impacts of the EBB plan would be similar to the WBRL plan; however, the EBBL plan would require, in addition, land creation to compensate for lost sediments and at least seven fresh-water diversion structures. The diversion structures would be similar to the currently operational Ballendock structure on Bayou Lamoque south of Bohemia. Each structure would consist of four 12-foot box culverts placed in the levee, with an outfall channel leading into the surrounding wetlands.

#### **4.5. COMPARATIVE IMPACTS OF ALTERNATIVES**

4.5.1. A comparative summary of the project impacts is in Table 4.5.1.

TABLE 4.5.1.  
COMPARATIVE IMPACTS OF ALTERNATIVES

RESOURCE	BASE CONDITION	FUTURE WITHOUT PROJECT	WEST-BANK RIVER LEVEE	EAST-BANK BARRIER LEVEE
MARSH	Extensive areas of fresh and estuarine marsh are located along the Mississippi River levee back slopes.	Marshes would continue to become more saline and then degrade as the area subsides. Marsh is being lost at a rate of about 1.3% per year.	This plan would have minimal to no impact on marsh.	About 64 acres of fresh marsh and 553 acres of estuarine marsh would be lost to levee construction and borrow removal. Marsh losses would be accelerated due to the reduced flow of sediments into the surrounding wetlands.
SHALLOW WATER BODIES	Shallow water bodies are dispersed throughout the marshes of Breton Sound.	Shallow water bodies are increasing at a rate over 1% per year due to subsidence and sea level rise. South of Bayou Lamoque these areas would gradually fill.	This plan would not impact shallow water bodies.	About 10 acres of shallow open water would be lost initially. Reduced flows of sediments would accelerate the gain of open water.
ENCLOSED LEVEE FOREST	Less than 400 acres of this habitat remain in the protected area.	Levee forest in the protected area is being cleared at a rate of about 3% per year.	About 13 acres of this habitat would be lost for levee placement.	No impact.
BATTURE WOODLANDS	Batture woodlands occur along the Mississippi River.	Most of the woodlands would remain throughout the project life.	About 147 acres of this habitat would be lost on the levee right-of-way and 664 acres in the borrow area. All but 9 acres are willow. About 34 acres of willow stands would be removed for flotation channels.	About 127 acres of this area would be lost for levee construction and 184 acres for borrow. This area is composed of willow, cottonwood/sycamore, and live oak habitats. The borrow areas would eventually refill.

TABLE 4.5.1.  
COMPARATIVE IMPACTS OF ALTERNATIVES (Cont'd)

RESOURCE	BASE CONDITION	FUTURE WITHOUT PROJECT	WEST-BANK RIVER LEVEE	EAST-BANK BARRIER LEVEE
MISSISSIPPI RIVER	South of Bohemia the Mississippi River is contained between the Mississippi River and Tributaries levee on the west bank and a natural alluvial ridge on the east bank.	Near developed areas, the river would remain in the present alignment. South of Bohemia, small distributaries would form on the east bank as the natural alluvial ridge subsides.	Approximately 4 acres of river bottom would be impacted by levee placement and 577 acres impacted by borrow removal. About 33 acres of old floatation in the river channel would be re-dredged.	No impact
FISHERIES	Fisheries resources are commensurate with the extent of the Mississippi River, estuarine water bodies, and marshes present. The Breton Sound complex produces the largest number of oysters in the state.	Because of subsidence and saltwater intrusion, fisheries would decline. Primary oyster beds would continue to move inland.	Batture spawning areas adjacent to the river would be lost.	About 617 acres of highly productive marsh would be destroyed, and marsh loss accelerated.
WILDLIFE	The wildlife resources available are commensurate with the area of woodland and marsh.	Wildlife resources would diminish as subsidence and sea level rise reduce the habitat quality and quantity.	About 811 acres of batture woodlands and 13 acres of remnant levee forest would be lost.	About 311 acres of batture woodlands and 617 acres of marsh would be impacted.
ENDANGERED AND BLUE LIST SPECIES	Several endangered species are transients in the area.	The loss of marsh and woodlands could reduce the habitat available to these species.	This work would not impact the continued existence of these species.	This work would not affect the continued existence of this species.

TABLE 4.5.1.  
COMPARATIVE IMPACTS OF ALTERNATIVES (Cont'd)

RESOURCE	BASE CONDITION	FUTURE WITHOUT PROJECT	WEST-BANK RIVER LEVEE	EAST-BANK BARRIER LEVEE
CULTURAL RESOURCES	29 terrestrial sites from shell middens to towns. Over 40 shipwrecks of which 26 are at Forts Jackson and St. Phillips. Exact locations unknown, but many in batture.	All sites would remain, but continue to degrade.	At least three sites would be destroyed.	Over 30 sites would be destroyed or severely impacted.
	Fort Jackson and Fort St. Phillip are both National Historic Landmarks on the National Register of Historic Places.	Both forts would remain: St. Phillip would continue to degrade.	The project would have a visual, and possibly direct physical impact, on Fort Jackson outbuildings.	Project would directly and adversely affect Fort St. Phillip.
RECREATIONAL RESOURCES	Hunting and fishing are major recreational activities of the area. Bohemia Wildlife Management Area is located within the project area.	Over time, the demand for recreational public lands would increase. The management area is leased from the Orleans Levee Board, and the lease is subject to revocation.	About 581 acres of Mississippi River bottom would be affected, and 772 acres of batture woodland would be lost. About 509 acres of batture woodland are within the Bohemia Wildlife Management area. About 210 man-days of recreation would be lost annually.	About 311 acres of forest in the Bohemia Wildlife Management area would be lost. Approximately 617 acres of marsh would be destroyed. At least 12,500 man-days of recreation would be lost annually.

TABLE 4.5.1.  
COMPARATIVE IMPACTS OF ALTERNATIVES (Cont'd)

RESOURCE	BASE CONDITION	FUTURE WITHOUT PROJECT	WEST-BANK RIVER LEVEE	EAST-BANK BARRIER LEVEE
WATER QUALITY	The Mississippi River and surrounding wetlands experience saltwater intrusion and high concentrations of fecal coliform bacteria, toxic metals, and synthetic volatile organics.	Saltwater intrusion into the river would continue. Bacterial densities would decrease as treatment facilities are brought up to grade. Toxic materials released in the water could continue to be a problem.	A short-term release of metals and nutrients into the river would be expected during dredging of borrow material and levee construction.	A short-term release of metals and nutrients into the surrounding wetlands would be expected during dredging of borrow material and levee construction.
TAX REVENUES	Tax revenues are commensurate with the current level of flood protection.	Tax revenues would be needed commensurate with the cost of replacing future flood damages.	The cost of the project would require additional tax revenues. Improved flood protection could reduce the need for increased tax revenue in the future.	Impacts would be the same as the WBRL Plan.
PROPERTY VALUES	The value of property in the project area is frequently threatened by flooding.	The value of existing property would continue to be depressed due to the threat of flooding.	With additional flood protection, property values would increase.	Same impact as the WBRL Plan.
LAND USE	Land along the Mississippi River has historically experienced floods and hurricanes.	The existing conditions would likely continue.	The WBRL Plan is designed to control flooding, protect existing lands from further loss, and enhance their current use.	Same impact as the WBRL Plan.

TABLE 4.5.1.  
COMPARATIVE IMPACTS OF ALTERNATIVES (Cont'd)

RESOURCE	BASE CONDITION	FUTURE WITHOUT PROJECT	WEST-BANK RIVER LEVEE	EAST-BANK BARRIER LEVEE
PUBLIC FACILITIES & SERVICES	Louisiana Highway 23 and various local roads, schools, churches, local police and fire protection facilities, and other public facilities and services are located in the project area.	These facilities and services could suffer from current flood frequencies.	The project would reduce flood damage to these facilities and aid in maintaining existing services.	Same as the WBRL Plan.
COMMUNITY AND REGIONAL GROWTH	Plaquemines Parish experienced rapid growth during the 1950's as a result of the expansion of petrochemical industries. Recent growth has virtually come to a halt due to the present slump in the oil industry.	The limited availability of land, as well as potential flood and hurricane damage would restrict growth in the area.	The proposed plan could encourage a small amount of growth in the local communities, but is not likely to significantly influence regional growth patterns.	Same as the WBRL Plan.
EMPLOYMENT	Plaquemines Parish and the adjacent New Orleans Standard Metropolitan Statistical Area (SMSA) have suffered from significant unemployment and underemployment in recent years.	Existing conditions may continue.	Construction of the project could stimulate minor increases in employment for local residents and workers living in the New Orleans SMSA.	Same as the WBRL Plan.



TABLE 4.5.1.  
COMPARATIVE IMPACTS OF ALTERNATIVES (Cont'd)

RESOURCE	BASE CONDITION	FUTURE WITHOUT PROJECT	WEST-BANK RIVER LEVEE	EAST-BANK BARRIER LEVEE
BUSINESS AND INDUSTRIAL ACTIVITY	Industrial plants and small businesses are located along the river.	Industrial and business activity along the river would continue, with occasional problems caused by flooding and hurricanes.	Existing conditions would probably continue; however, enhanced property values resulting from additional flood protection could encourage growth in the area.	Same as WBRL Plan.
AGRICULTURAL LAND/DISPLACE- MENT OF FARMS	The project area includes a small amount of land devoted to agricultural production.	Agricultural land would remain subject to historical flooding.	About 34 acres of farmland would be lost due to levee construction. Flooding due to hurricanes would be reduced.	No farmland would be directly lost. Flooding of agricultural land would be reduced.
RELOCATIONS	Storm damage to structures would force temporary relocations to areas where flood damages are reduced.	The existing conditions would likely continue.	About 15 houses and 25 trailers within the levee rights-of-way would be relocated.	No relocations required.
FLOOD CONTROL	The existing MR&T levee provides some hurricane protection. The area is likely to receive occasional flooding.	The pattern of occasional flooding within the project area would likely continue.	The flood damage caused by river stages above the 100-year level would not be expected to occur.	Same as the WBRL Plan.

TABLE 4.5.1.  
COMPARATIVE IMPACTS OF ALTERNATIVES (Cont'd)

RESOURCE	BASE CONDITION	FUTURE WITHOUT PROJECT	WEST-BANK RIVER LEVEE	EAST-BANK BARRIER LEVEE
NOISE	The primary sources of noise are river traffic, industrial plants, and vehicles traveling on Louisiana Highway 23.	Current conditions would likely continue.	Any socioeconomic activity which the plan stimulates could result in an increase in noise levels; however, no increases to dangerous levels are anticipated. About 650 structures would be subjected to noise over 84 decibels (DBA) during construction.	No effect.
POPULATION	The 1980 Census estimated population of the project area at approximately 12,900.	Population is not likely to grow significantly.	Improved flood protection could encourage moderate population growth.	Same as the WBRL Plan.
ESTHETIC VALUES	Changes in esthetic values have occurred due to economic development and as a result of flood damage.	Base conditions would likely continue.	The levee would be raised and the river not as visible.	No effect.
COMMUNITY COHESION	Local interests support hurricane protection.	Local interests would probably continue their support for improved flood protection along the west bank.	Project would enhance cohesion by providing hurricane protection.	Same as WBRL Plan.

## **5. AFFECTED ENVIRONMENT AND ENVIRONMENTAL EFFECTS**

### **5.1. ENVIRONMENTAL CONDITIONS**

The project area is within the modern subdelta of the Mississippi Deltaic Plain region of Southeastern Louisiana and is characterized by low elevation from 5 feet National Geodetic Vertical Datum (NGVD) to sea level. For environmental analysis, the area along the Mississippi River from the vicinity of Bohemia south to near Venice was examined in detail. Water levels in the marshes, river passes, and Mississippi River outlets are tidal and/or wind-influenced. Due to its proximity to the Gulf of Mexico, the study area has a subtropical marine climate. The major natural vegetative communities are marshes and levee forests. On the west side, between the Mississippi River and back protection levees, agricultural crops such as sugarcane, corn, pecans, and citrus fruit are grown. On the east side, between the Mississippi River and estuarine water bodies, intermediate to saline marshes are present. These marshes provide spawning and nursery areas that support a good sport and commercial fishery for fin and shellfish. Harvestable animal species include furbearers, migratory waterfowl, and deer. Fishing, hunting, boating, camping, and picnicking are popular recreational activities in the study area.

### **5.2. SIGNIFICANT RESOURCES AND ENVIRONMENTAL EFFECTS**

This section describes the significant resources listed in Table 4.5.1, and examines the effects of each alternative on these resources. A given resource is designated as significant because: it is identified in the laws, regulations, guidelines, or other institutional standards of national, regional, or local agencies; it is specifically identified as a concern by local public interests; or it is judged by the Corps of Engineers to be of sufficient importance to be so designated. The Environmental Quality (EQ) attributes can be found in Table 5.2.1. and EQ recognition in Table 5.2.2. Socio-economic resources are discussed as required by Section 122 of the River and Harbor Act of 1970. The habitats impacted, and area of each, are presented in Table 5.2.3.

TABLE 5.2.1  
ENVIRONMENTAL QUALITY ATTRIBUTES

RESOURCE	ECOLOGICAL ATTRIBUTES	CULTURAL ATTRIBUTES	ESTHETIC ATTRIBUTES
MARSH	Nursery area for estuarine finfish and shellfish. Supports a variety of birds, mammals, reptiles, and amphibians. Detritus is basic element of food web.	Supports traditional extractive economy of coastal Louisiana.	Typical Louisiana landscape.
SHALLOW WATER BODIES	Major nursery area for estuarine dependent fish and shellfish.	---	Typical Louisiana landscape.
ENCLOSED LEVEE FOREST	The levee forest provides valuable habitat for birds and mammals.	The drier areas of the ridge support the traditional extractive economy of the area.	The levee forest areas often contain moss-draped trees.
BATTURE WOODLANDS	Provide marginal fish and wildlife habitat.	Has little cultural significance.	Trees line the Mississippi River.
MISSISSIPPI RIVER	The river nourishes the Delta area with fresh water and sediments.	Was used as an avenue to explore and settle the Lower Mississippi Valley.	Provides a backdrop for many parks, restaurants, and businesses.
FISH and WILDLIFE	Many species of fish and wildlife utilize the project area.	Traditional extractive economy utilizes many species of fish and wildlife.	---

TABLE 5.2.1  
ENVIRONMENTAL QUALITY ATTRIBUTES (Continued)

RESOURCE	ECOLOGICAL ATTRIBUTES	CULTURAL ATTRIBUTES	ESTHETIC ATTRIBUTES
ENDANGERED and BLUE LIST SPECIES	No species breeding in study area. Some species are transients. The Blue List indicates declines in numbers or a decrease in range.	---	---
CULTURAL RESOURCES	---	Indicators of previous residents.	---
RECREATIONAL RESOURCES	Potential for observing and interacting with nature; also conducive to recreational hunting and fishing.	Extractive culture of coastal Louisiana includes extensive hunting and fishing.	---

TABLE 5.2.2  
ENVIRONMENTAL QUALITY RECOGNITION

RESOURCE	INSTITUTIONAL RECOGNITION	TECHNICAL RECOGNITION	PUBLIC RECOGNITION
MARSH	Coastal Zone Mgmt. Act of 1972; Clean Water Act of 1977; Louisiana State and Local Coastal Resources Mgmt. Act of 1978; E.O. 11990; E.O. 11988; Estuary Protection Act; Fish and Wildlife Coordination Act.	Marsh is important in production of estuarine-dependent fishes of sport and commercial importance and in production of wildlife. Habitat for 12 Species of Special Emphasis.	Environmental groups and public support preservation and creation of marsh.
SHALLOW WATER BODIES	Clean Water Act of 1977, La. Water Control Law, Estuary Protection Act.	Major nursery area. Habitat for Species of Special Emphasis.	Environmental groups and general public desire clean water for multiple uses.
ENCLOSED LEVEE FOREST	Coastal Zone Mgmt. Act of 1972, La. State and Local Coastal Resources Mgmt. Act of 1978, E.O. 11990. E.O. 11988, Protection of Cypress Trees (LA EO 1980-3).	Habitat for 5 Species of Special Emphasis and is being lost at a rapid rate.	Environmental groups desire preservation of this habitat.
BATTURE WOODLANDS	Same as Marsh.	Minor wildlife habitat. Used by nesting and migratory birds, and spawning area during high water.	Some areas used for recreational hunting and fishing.
MISSISSIPPI RIVER	Clean Water Act of 1977, Flood Control and Protection Act of 1928, River and Harbor Act of 1899.	The 2,350-mile river drains 41% of the continental U.S. Used as a municipal and agricultural water supply, and as a navigable waterway.	The public is generally aware of the importance of the river to transportation, water supply, etc.

TABLE 5.2.2  
ENVIRONMENTAL QUALITY RECOGNITION (Continued)

RESOURCE	INSTITUTIONAL RECOGNITION	TECHNICAL RECOGNITION	PUBLIC RECOGNITION
FISH and WILDLIFE	Fish and Wildlife Coordination Act.	---	Recreational fishing and hunting occur near the project area.
ENDANGERED and BLUE LIST SPECIES	Endangered Species Act. Bald Eagle Act. Audubon Society.	Species on Blue List in area. No critical habitat.	Environmental groups and public desire protection of these species.
CULTURAL RESOURCES	National Historic Preservation Act of 1966, Archeological Protection.	National Register properties in the project area are Fort Jackson and Fort St. Phillip.	Use and development of historical and cultural sites are indicative of interest.
RECREATIONAL RESOURCES	Land and Water Conserva- tion Fund Act of 1965.	---	Public desires expansion of recreational base. Louisiana recognized as a "Sportsman's Paradise."

TABLE 5.2.3.

HABITAT IMPACTS  
(In 1986 acres)

HABITAT	ALTERNATIVES			
	WEST BANK RIVER LEVEE		EAST-BANK BARRIER	
	Levee	Borrow	Levee	Borrow
Marsh	0	0	251 <sup>a/</sup>	366 <sup>a/</sup>
Shallow Water Bodies	0	0	4	6
Enclosed Levee Forest	13	0	0	0
Batture Woodland	147	664 <sup>b/</sup>	127	184
Mississippi River	4	577	0	0
Levee	453	0	122 <sup>c/</sup>	3
Developed	237 <sup>d/</sup>	0	28	41
TOTAL	854 <sup>e/</sup>	1241	532	600

a/ Estuarine marsh, except for 26 acres of fresh marsh in the levee rights-of-way and 38 in the borrow alignment.

b/ Black willow dominated habitat, except for 9 acres of sycamore/cottonwood.

c/ About 120 acres are the existing MR&T levee from Venice to Ft. Jackson.

d/ Includes 34 acres of agricultural land.

e/ The total does not include 67 acres of flotation channels, half of which are previously used channels.



The habitat changes in the WBRL area, (in acres) over the project life can be seen in Figure 5.2.1. and for the EBBL can be found in Figure 5.2.2. The graphics shown were primarily based on data generated by (Wicker, 1980) and information provided by the USFWS Coordination Act (Appendix A), and are displayed to give the reader a general impression of the FWP and FWOP conditions. With the exception of the indirect impacts for the EBBL, the habitats shown in the figures are the areas directly impacted by construction activities. The FWOP changes in habitat types were based on the project area changes calculated from 1956 to 1978, and applying the rates to the base acreages. Additional details may be found in Appendix E-Habitat Analysis.

A Habitat Evaluation Procedure (HEP) was conducted by Federal and state biologists to evaluate impacts of the alternatives. The HEP, developed by the U.S. Fish and Wildlife Service, provides a method to describe present and future habitat conditions, and is based on the assumption that a group of representative species is indicative of the habitats value. The unit of measure is an average annual habitat unit (AAHU), which is the habitat quality (Habitat Suitability Index) multiplied by the average annual area of habitat available over the project life. Additional information may be found in Appendix A, USFWS Coordination Report (CAR). The CAR analyses evaluate both the WRBL and EBBL impacts, plus Reach C. Because this EIS only examines the barrier impacts, Appendix E presents HEP data for barrier impacts.

#### 5.2.1. Marshes

##### 5.2.1.1. Existing Conditions

The coastal marshes of the study area lie immediately to the gulf side of the natural ridge along the Mississippi River and range in elevation between 1 and 2 feet NGVD. Because the marsh is interlaced with many

FIGURE 5.2.1.  
HABITAT CHANGES OVER THE PROJECT LIFE  
WEST-BANK RIVER PLAN  
(Area in Acres)

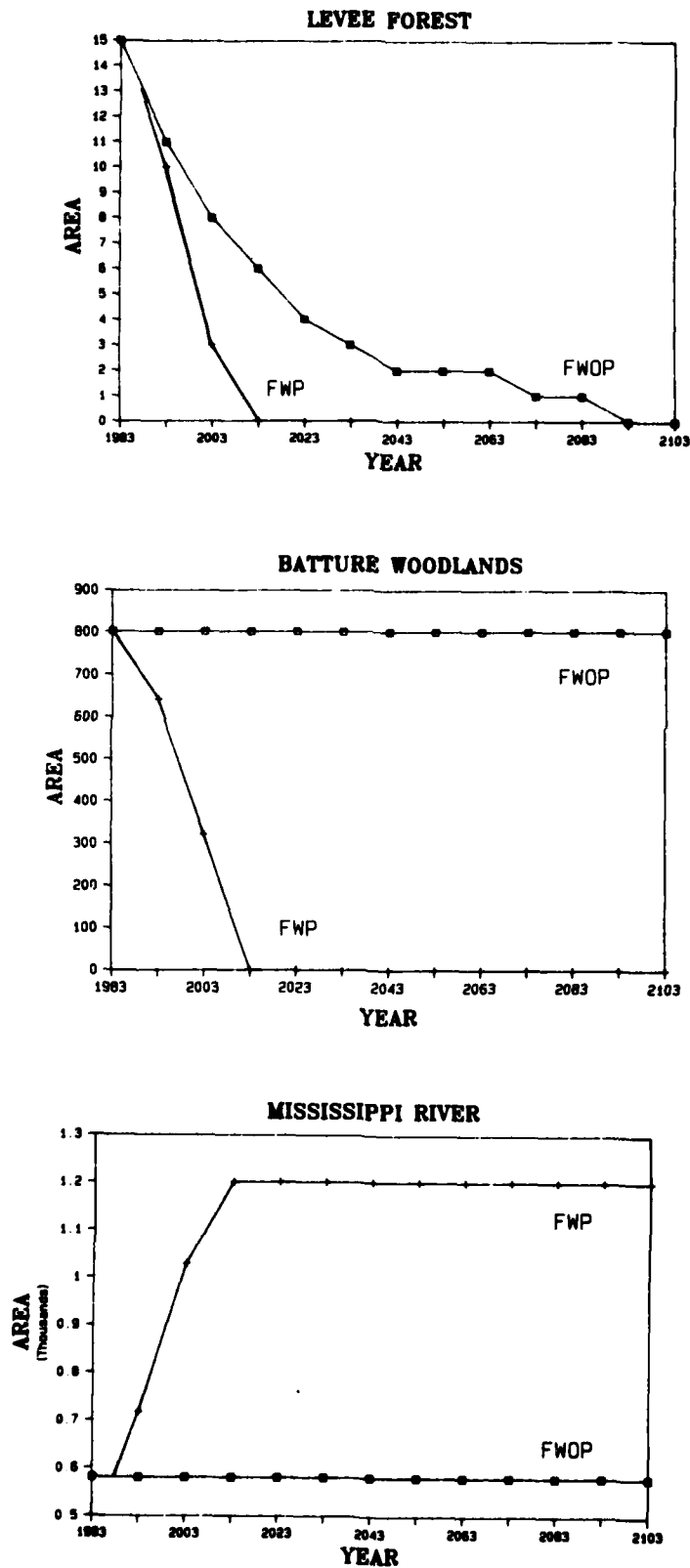


FIGURE 5.2.1. (Continued)

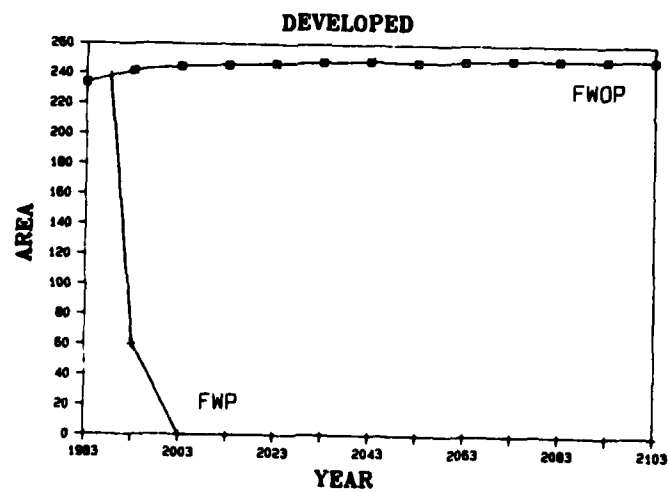
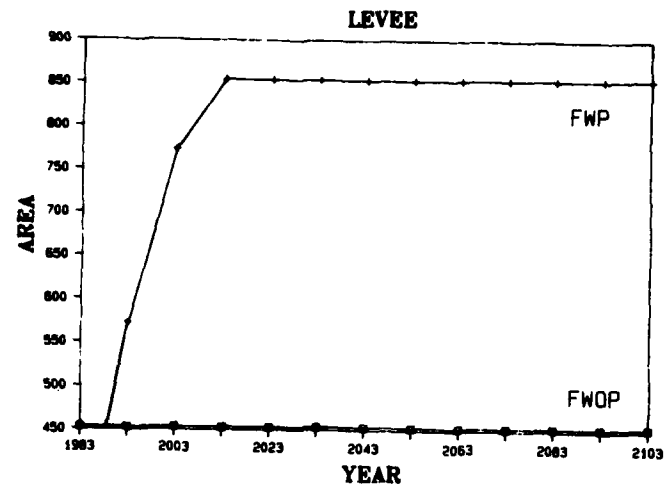


FIGURE 5.2.2.  
HABITAT CHANGES OVER THE PROJECT LIFE  
EAST-BANK BARRIER LEVEE  
(Area in Acres)

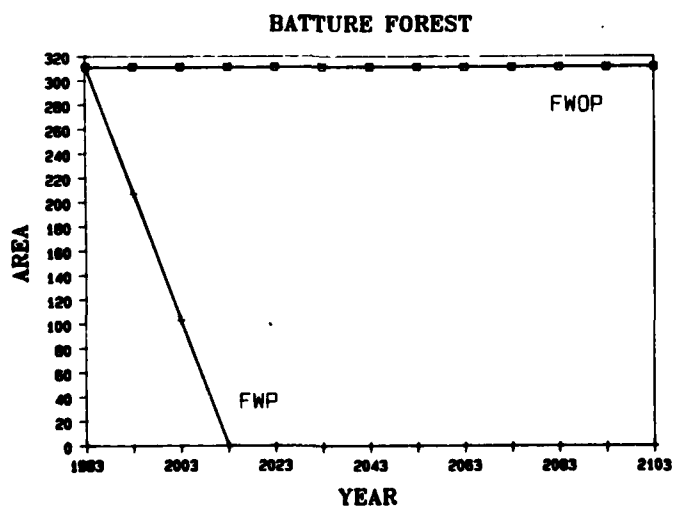
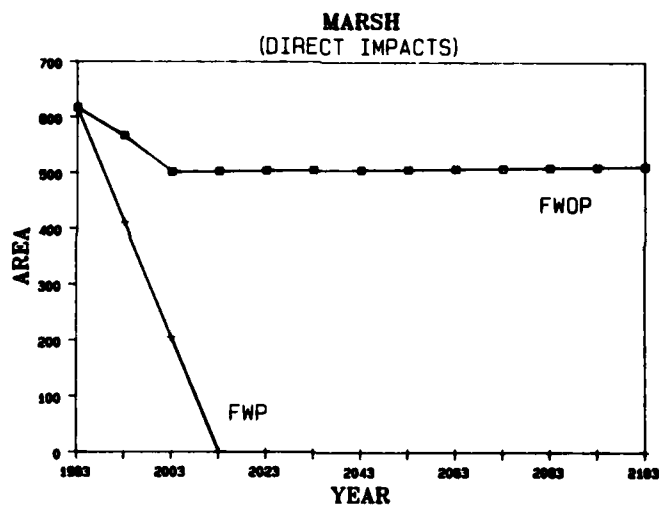
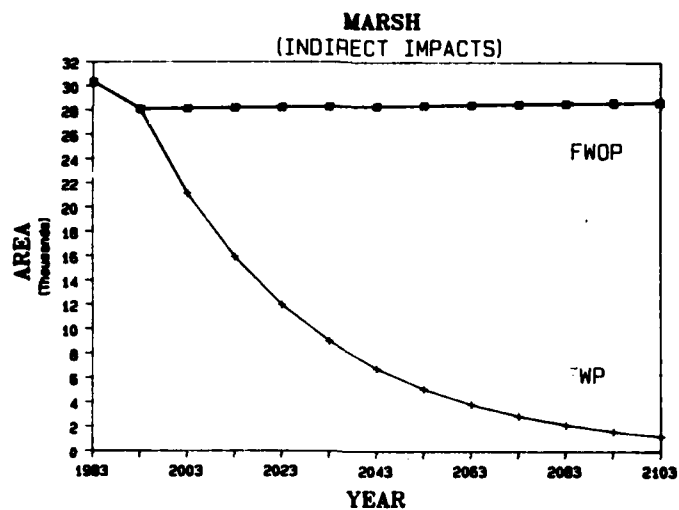
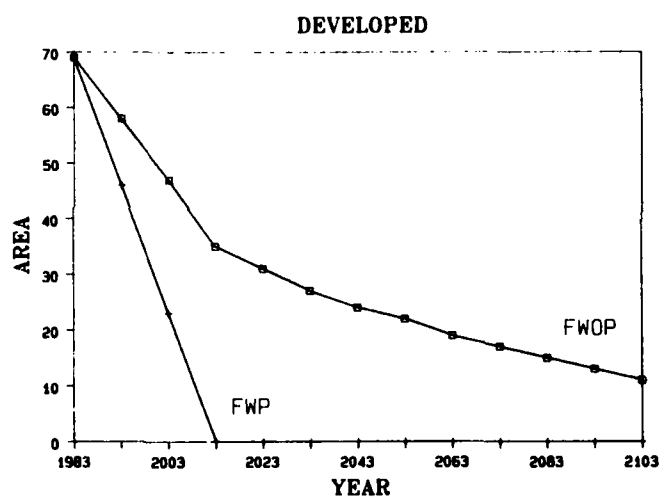
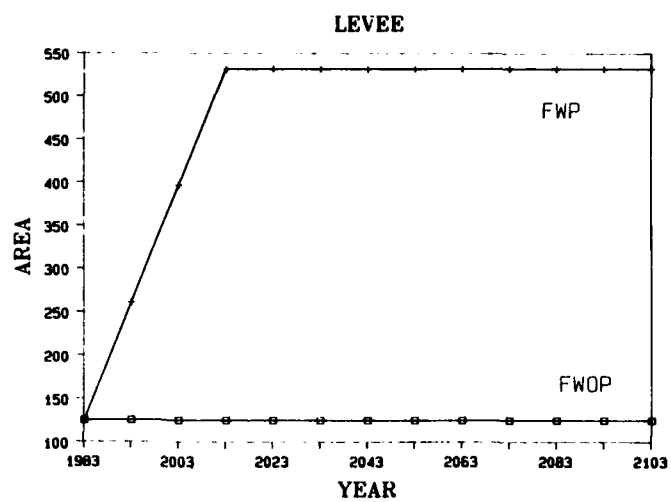


FIGURE 5.2.2. (continued)



bayous and tidal creeks, it is tidally influenced. Despite low vegetative diversity, productivity in the marsh is high and a large animal population is supported. Productivity of Louisiana marsh is one to two times greater than Atlantic Coast marshes (Van Beek, et al., 1981). Dominant plants in the estuarine marsh are oystergrass, glasswort, wiregrass, three-cornered grass, blackrush, and saltgrass. In the fresher marsh bull tongue, wiregrass, sawgrass, water hyssop, panic grass, and cattail are present. Epiphytic algae and diatoms are also important in the marsh. Because the marsh food chain is based on disintegrating plant material (detritus) the predominate animals are detrital feeders, such as crabs, snails, and insects. Vertebrates, such as wading birds, waterfowl, raccoons, muskrats, and nutria, are also common.

#### 5.2.1.2. Future Without-Project

Most marshes in the study area are disappearing at a rate of about 1.3 percent per year, and this loss is expected to accelerate. The area immediately east of the Mississippi River from Bayou Lamoque south to Baptiste Collette Bayou would accrete marsh during high water periods.

#### 5.2.1.3. WBRL

No marshes would be impacted with this alternative.

#### 5.2.1.4. EBBL

About 617 acres of marsh would be lost directly with implementation of this alternative. Approximately 26 acres of fresh marsh and 225 acres of estuarine marsh would be converted to grassy levees, and 38 acres of fresh marsh and 328 acres of estuarine marsh converted to open-water borrow pits. In addition to these direct losses as a result of levee construction, losses of 3 percent or more would occur as fresh water and sediments would no longer freely nourish the wetlands east of the Mississippi River and south of Bayou Lamoque during highwater periods on

the river. These marsh losses would result in the loss of valuable habitat which provides food, cover, and reproductive habitat for various fish and wildlife species. These species, in turn, provide commercial, recreational, and scientific benefits to man. About 673 AAHU's would be lost to the evaluation species as a result of direct impacts, and 26,612 to indirect impacts.

#### 5.2.2. Shallow Water Bodies

##### 5.2.2.1. Existing Conditions

Many fresh to saline shallow water bodies of various sizes and depths are interspersed in the study area. These are generally flat bottomed with a natural depth of 1 to 12 feet. Greater depths occur in the tidal passes and navigational channels. Louisiana estuaries are very important nursery grounds for commercial and sport fish as well as for shrimp, oysters, and crabs. The energy input for the estuaries comes from the marshes although, photoplankton and benthic plants provide limited supplies. Vascular plants are extremely limited in the estuarine waters of the study area. The highest concentrations of organisms are found within the mud and include nematodes, copepods, and amphipods; however, a few sessile organisms exist on the soft, muddy bottoms.

##### 5.2.2.2. Future Without-Project

Fresh and estuarine shallow open water areas of the project area are increasing at a rate of over one percent per year. This rate is expected to accelerate due to subsidence and sea-level rise. Shallow water bodies south of Bayou Lamoque would fill as marsh is created during overcropping of the subsiding local levee.

##### 5.2.2.3. WBRL

Implementation of this alternative would have no impact on shallow water bodies.

#### 5.2.2.4. EBL

This alternative would result in the conversion of four acres of shallow open water areas to grassy levees and six acres to deep less productive borrow pits. Shallow water bodies south of Bayou Lamoque would not become marsh.

#### 5.2.3. Enclosed Levee Forest

##### 5.2.3.1. Existing Conditions

In the protected areas of the project, several isolated areas of abandoned agricultural lands are reverting to secondary levee forest with vegetation similar to a natural levee forest. Trees characteristic of these sites are live oak, hackberry, red maple, and sweet pecan. The alluvial ridges along the Mississippi River historically were vegetated by natural levee forests capable of withstanding periodic river overflow; however, most of the virgin levee forests have been surrounded by levees and cleared for agricultural or developmental uses. These forests were typically composed of live oak, water oak, hackberry, American elm, white ash, honey locust, and hawthorn, and are at an elevation of 5 feet NGVD or more.

##### 5.2.3.2. Future Without-Project

The remnant, enclosed levee forests within the protected area would continue to be lost at a rate of about 3 percent per year. The remaining forest would continue to undergo succession toward a mature forest with a species composition similar to the natural levee forest.

##### 5.2.3.3. WBRL

With this plan, about 13 acres of this habitat type would be converted to grassy levees. About 3 AAHU's would be lost.



#### 5.2.3.4. EBBL

No levee forests would be impacted.

#### 5.2.4. Batture Woodlands

##### 5.2.4.1. Existing Conditions

Vegetation of the batture area is typical of natural levee frontlands created by the alluvial deposits of the Mississippi River and exposed to periodic river flooding. Along the river's edge, rapidly growing pioneer plant species characteristic of frequently flooded, disturbed areas are found. The dominant plant adjacent to the river is black willow, with an understory of lead plant, elderberry, butterweed, and golden rod. As the levee ridge is approached, the vegetation transitions to less flood tolerant species such as sycamore, cottonwood, pecan, and hackberry with an understory of elderberry, dewberry, tallow tree, rough leaf dogwood, butterweed, golden rod, pepper vine, and poison ivy. In some sites, hackberry is the dominant tree with black willow prevailing in the swales. In very high areas, mature alluvial levee forests are found which are only rarely flooded.

##### 5.2.4.2. Future Without-Project

The area of batture woodland would remain relatively stable, although the specific location may vary with the erosion and deposition of the Mississippi River banks.

##### 5.2.4.3. WBRL

With the WBRL alternative, about 147 acres of batture woodland would be destroyed within the levee rights-of-way and 664 acres would be lost to borrow pits. The borrow pit area includes 9 acres of sycamore/cottonwood habitat. These areas would not recover. About 33 acres of willow woodland

would be temporarily impacted for flotation channels, but would rapidly fill in and be recolonized with willows. About 912 AAHU's would be lost. Maintenance repair activities may require batture woodland for stockpiling areas, roads, or flotation channels. The impact of these activities would be temporary.

#### 5.2.4.4. EBB

With the EBBL plan, about 127 acres of batture woodland would be converted to levees and 184 acres for borrow. The levee losses would be permanent, but the borrow sites would eventually fill in, and revert to a willow batture habitat. About 355 AAHU's would be lost. Maintenance repair activities may require batture woodland for stockpiling areas, roads, or flotation channels. The impact of these activities would be temporary.

#### 5.2.5. Mississippi River

##### 5.2.5.1. Existing Conditions

The project area owes its existence to the delta-building activities of the lower Mississippi River during the past 5,000 years. The river is an important navigational route and provides fresh water for both domestic and agricultural uses. Although the river has been leveed in most areas, overflow of the river into the marshes of Breton Sound south of the Bohemia Wildlife Management area still occurs, and the river is an important source of fresh water and sediments in this area. Vascular plants are extremely limited in the river; however, green flagellates and centric diatoms are common. The river benthos is influenced to a great extent by substrate type, bottom stability, river velocity, salinity, and the vegetation present. Waters near the riverbanks have a lower velocity, and the bottom substrate is finer than in the middle.

#### 5.2.5.2. Future Without-Project

The Mississippi River would remain essentially the same, except for minor areas of deposition and erosion along the river banks.

#### 5.2.5.3. WBRL

With this alternative, about 4 acres of channels connected to the Mississippi River would be filled in for levee/wave berm construction. Approximately 577 acres of river bottoms along the eastern side of the river from the batture out to the -15 foot contour would be removed to a depth of 15 feet. Turbidity would increase in the vicinity of dredging and disposal operations; however, impacts to the Mississippi River and associated fauna would be minimal due to the high ambient turbidity and natural bottom disturbances of the river. During operation, maintenance, and repair activities, river areas may be required for stockpiling areas, flotation channels, barge anchorage, and other activities with short-term impacts.

#### 5.2.5.4. EBBL

The Mississippi River would not be impacted. The borrow areas would be contiguous with the river, but would eventually fill in. During operation, maintenance, and repair activities, river areas may be required for stockpiling areas, flotation channels, barge anchorage, and other activities with short-term impacts.

#### 5.2.6. Fisheries

##### 5.2.6.1. Existing Conditions

Two major fishery habitats, marsh with its associated shallow water and the Mississippi River, are within the project area. The deep main channel and shallow edges typify the aquatic habitats in the turbid Mississippi River. Fishes in the main channel include the paddle fish, gar, sturgeon,

and buffalo. In the shallow areas, minnows, shad, sunfish, and catfish occur. In the lower portion of the river, higher salinities result in menhaden, anchovies, red drum, seatrout, and croaker. Because of the marshes and interaction between fresh and saltwater, a diversity of fishes exists in the area. In the marsh, the most abundant sport and commercial species are young and adults of the Atlantic croaker, spot, Gulf menhaden, spotted seatrout, black drum, red drum, sheepshead, southern flounder, sea and gafftopsail catfish, striped mullet, and silver perch. Small estuarine fish important in the food web are: the bay anchovy, killifish, blennies, gobies, and silversides. About 14 million pounds of fish worth about \$1 million per year are harvested from Breton Sound.

The oyster harvest in Breton Sound results in the annual take of about 6 million pounds of meats worth about \$10 million dockside. The oyster is generally harvested from shallow, well-mixed estuaries that often fluctuate widely in temperature and salinities. Optimum temperatures for adult oysters are about 70 to 85 degrees Fahrenheit (F) and optimum salinity range for oysters is 10 to 28 parts per thousand (ppt). At levels above 15 ppt, the oyster is subject to considerable predation, parasitism and disease (Cake, 1983).

Shrimp, among the most important commercial species in Louisiana, rank first in dollar value and second in poundage. About 13 million pounds of shrimp worth about \$15 million are harvested from Breton Sound. Of the six commercially important species of shrimp caught in Louisiana, the estuarine-dependent white shrimp and brown shrimp, are most abundant. The life cycles of these shrimp are essentially the same. After the adults spawn in the gulf, fertile eggs hatch into free-swimming larvae that pass through a series of molts until they reach the post-larval stage. In this stage, the juvenile shrimp migrate into estuarine areas and adopt a more benthic existence where they feed on detritus, algae, and microfauna. The estuarine phase is critical because fluctuations in water level, temperature, and salinity dramatically affect the amount of suitable marsh available. As the shrimp grow, they gradually move into deeper water and eventually return to the gulf.

#### 5.2.6.2. Future Without-Project

The habitat for fish and other aquatic organisms within the Mississippi River would remain relatively stable. With improvements in water quality, these populations could be expected to increase. The fisheries species, especially shrimp and oyster, would continue to be harvested from the estuarine area east of the Mississippi River; however, the catch would slowly decline as the marshes erode and subside due to a reduction in marsh productivity and as salinity increases. With the area continuing to subside, saltwater intrusion would eventually increase the salinity above the 15 parts per thousand level at which the oyster drill would invade the beds. Marsh would continue to accrete east of the river and south of Bayou Lamoque.

#### 5.2.6.3. WBRL

With this plan, about 811 acres of seasonally flooded batture woodland would be impacted. These areas would no longer be available for fish spawning, protection, or foraging. Approximately 147 acres of temporarily flooded woodland would be permanently unavailable fisheries habitat and about 664 acres converted to borrow sites. Within 581 acres of river bottoms impacted, some fisheries value would be lost as the shallow water areas are converted to deeper water. Because of the ephemeral, turbid nature of the river and the adaptation of aquatic organisms residing in the river, the fish populations would return to near normal conditions upon project completion.

#### 5.2.6.4. EBBL

With this alternative, about 127 acres of batture land would be utilized for levee construction and 184 for borrow. An additional 255 acres of highly productive shallow open water and marsh would be permanently lost to levee rights-of-way, and 372 acres of this habitat converted to borrow sites. The impacts of the batture land loss are similar to those previously described for the WBRL plan. A reduction in

fisheries would occur as a result of wetland losses. The direct impacts of levee construction on fisheries is minor, however, relative to the indirect effects of freshwater and sediment overflow into the surrounding wetlands. These overflows are necessary to maintain the wetlands and provide a highly productive nursery for commercially harvestable fisheries. The EBBL would change oyster distributions in Breton Sound by restricting freshwater overflow.

#### 5.2.7. Wildlife

##### 5.2.7.1. Existing Conditions

Because of the extensive primary productivity of marsh, the area east of the Mississippi River is quite diverse and provides for a number of non-game species. A few reptiles are found in the area, including the gulf saltmarsh snake, diamondback terrapin, and alligator. Sea turtles may enter the bays. Non-game birds present include grebes, loons, cormorants, and pelicans; egrets, ibis, and herons; marsh and red-shouldered hawks, kestrels, barred owls, and ospreys; sandpipers, willets, black-necked stilts, and killdeer; and gulls, terns, and skimmers. Mammals found here are the skunk, opossum, and armadillo as well as rats, mice, and shrews. The harvestable wildlife of the marsh are primarily mammals. Large populations of migratory waterfowl utilize the study area bays and marshes during the winter. These species include snow geese, blue-winged teal, mallards, pintails, green-winged teal, gadwall, widgeon, and lesser scaup. The mottled duck is a resident species of waterfowl. In addition, coots, gallinules, rails, and snipe are important game bird species. Because of the large populations of nutria, muskrat, mink, otter, and raccoon, Louisiana leads all states in fur production. Deer and rabbits are hunted in the marsh.

Within the levee forest, terrestrial animals with a preference for damp or humid areas are found. Reptiles and amphibians expected here include marbled salamanders; cricket, chorus, and tree frogs; the box turtle; the

anole; rat, cottonmouth, green, brown, and ribbon snakes. Representative birds noted include the white-breasted nuthatch, common yellowthroat, pine warbler, Carolina wren, downy and red-bellied woodpeckers, barred and barn owls, and red-tailed hawk. Mammals observed include cotton and golden mouse, short-tailed and southeastern shrews, the woodrat, armadillo, opossum, and fox squirrels. Common harvestable species found in this area are the white-tailed deer, swamp rabbit, mink, and racoon.

In the batture woodlands semi-aquatic species are often noted. Reptiles and amphibians expected here include marbled salamanders, cricket, leopard, and tree frogs; mud and red-eared turtle; rat, mud, and water snakes; and the anole. Birds found here include prothonotary warbler, tufted titmouse, parula warbler, boat-tailed grackle, yellow-crowned night heron, green heron, great blue heron, great egret, white ibis, and red-shouldered hawk. Few small rodents would be expected. Harvestable species include the wood duck, white-tailed deer, mink, beaver, racoon, and swamp rabbit. In the higher sycamore/cottonwood area of the batture woodlands, representatives of the levee forest are transitory.

#### 5.2.7.2. Future Without-Project

Wildlife populations of the enclosed levee forest would gradually decline as these areas are cleared for urban and agricultural interests. Wildlife losses in the levee forest are expected to be commensurate with the current 3 percent per year clearing rate of this habitat type. The populations utilizing the batture woodlands would be expected to remain relatively stable. The wildlife diversity found on the Bohemia Wildlife Management Area would be expected to remain stable as long as the Louisiana Department of Wildlife and Fisheries continues to manage and retain a lease on the area. Because the management area lands are owned by the Orleans Levee Board, and subject to legal claims by previous landowners, the continued existence as a wildlife area can not be assured. The wetland dependent wildlife populations would decline as the marshes and shallow open waters deteriorate at the current rate of 1.3 percent per year. In

the area east of the Mississippi River south of Bayou Lamoque, an expansion of wetland-dependent species would occur as wetlands gradually build due to fresh water, sediment, and nutrient overflow.

#### 5.2.7.3. WBRL

Wildlife species currently in the 13 acres of levee forest and 811 acres of batture woodland would be displaced, and the habitats destroyed. The majority of displaced species would be lost due to competition for their life requisites with residents of adjacent habitats. Wildlife utilizing the area of the proposed 33 acres of access channels would be impacted for 5 to 10 years.

#### 5.2.7.4. EBBL

Implementation of this plan would result in the direct loss of about 64 acres of fresh marsh and 553 acres of estuarine marsh, 311 acres of batture woodland, and 10 acres of shallow, open water. All wildlife in these areas would be displaced and the habitats unavailable for future use. In addition to these direct impacts, the marshes east of the Mississippi River would be starved of fresh water, sediments, and nutrients, and would be expected to deteriorate at a rate of 1 to 3 percent per year.

#### 5.2.8. Endangered and Blue List Species

##### 5.2.8.1. Existing Conditions

Various endangered or threatened species are, or could be, residents or transients in the study area. The leatherback sea turtle, hawksbill sea turtle, Kemp's ridley sea turtle, Arctic peregrine falcon, bald eagle, Eskimo curlew, eastern brown pelican, and sperm, humpback, sei, fin and right whales are classified as endangered by the U.S. Fish and Wildlife Service (USFWS). The loggerhead sea turtle and green sea turtle are classified as threatened. The American alligator is also classified as



threatened; however, in the study area, this classification has been reduced to threatened "due to similarity of appearance." Additional information on these species can be found in a Biological Assessment of Threatened and Endangered Species in the 1985 Final Supplemental EIS.

The "Blue List," published by the National Audubon Society cites bird species that are showing indications of noncyclical population decline or range contraction, either locally or throughout their range. This list, compiled by interested observers throughout the country, serves as an early warning system to indicate species that might be in danger of extinction. The 1982 "Blue List" includes 30 species of which 16 might be in the study area. These are listed in Table 5.2.4.

#### 5.2.8.2. Future Without-Project

Because of the current loss of marsh, habitat available to support endangered, threatened, or "Blue List" species would decline as would these populations in the area. Possible exceptions to this would be the sea turtles. They would benefit by the increased shallow water habitats available; however, prey availability could be expected to decline as the marshes disappear.

#### 5.2.8.3. WBRL

This plan would not jeopardize the existence of any endangered, threatened, and "Blue List" species or adversely affect critical habitat. A loss of marsh and woodland, with the resultant reduction in productivity, could reduce food resources for some species. Correspondence related to threatened and endangered species, is contained in Appendix C.

#### 5.2.8.4. EBBL

Same as 5.2.8.3. above.

TABLE 5.2.4

THE 1982 "BLUE LIST" SPECIES

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1. Western Grebe
  2. Least Bittern
  3. American Bittern
  4. Sharp-shinned Hawk
  5. Red-shouldered Hawk
  6. Marsh Hawk
  7. King Rail
  8. Piping Plover
  9. Snowy Plover
  10. Long-billed Curlew
  11. Least Tern
  12. Ruby-throated Hummingbird
  13. Hairy Woodpecker
  14. Eastern Bluebird
  15. Loggerhead Shrike
  16. Eastern Meadowlark
-

### 5.2.9. Cultural Resources

#### 5.2.9.1. Existing Conditions

In all probability, there was no human occupation of the area prior to 900 A.D. when the main course of the Mississippi River shifted into the project vicinity and began building land surfaces along the river and its distributaries. As in other parts of coastal Louisiana, human occupation in prehistory was probably limited largely to two kinds of landforms: (1) the crests of natural levees along the river and its distributaries; and (2) beaches that formed along bays near the Gulf.

With the exception of Forts Jackson and St. Philip (both National Historic Landmarks), the major Euro-American occupation of the area began after 1840. For a century thereafter, the dominant economic activity of east bank residents in the area has been oystering. However, other economic "experiments" have also been conducted. Large-scale farming has never been a successful enterprise, but "kitchen" gardens have often augmented the fishing and trapping subsistence pattern that characterizes much of the area. Until the advent of oil drilling and sulphur mining, the most notable industrial experiment not related to oystering was the Salt Works, which failed first as a salt-making venture, then failed again as an agricultural enterprise. Salinity and soil saturation have precluded successful cotton farming throughout the area. Sugar cane was also absent in the west bank portion of the project area, as well as in the east bank segment south of the Pointe-a-la-Hache Relief Outlet. Rice was grown at small dispersed homesteads over much of the project area during the middle 19th century, but declined in importance thereafter.

With a history of economic activities that favored a highly dispersed settlement pattern and with local production strongly centered around families and affines, few concentrations of populations in large communities occurred in the project area during the historic period. Historic occupation sites thus generally represent one or a few simple

dwellings; occasionally, as in the cases of Ostrica and Olga, small-scale commercial activities are also represented. The combined effects of flooding and hurricanes have destroyed all standing structures in the project area proper, all which were built before 1930 (with the exceptions of the cemeteries and the two forts). Midden deposits and substructural features associated with many of the 19th and early 20th century homesteads have undoubtedly been buried through subsidence and alluviation.

Of the 60 plus known cultural resource locations, none, with the exception of Forts St. Philip and Jackson, have been evaluated for their importance. The New Orleans District is developing two management plans which include Plaquemines Parish. The plans are the Southeast Louisiana Cultural Resource Management Plan and the Nautical Cultural Resource Management Plan. Both plans are expected to be operational in early 1988, after a Memorandum of Agreement is signed by the Corps, State Historic Preservation Office, and Advisory Council on Historic Preservation. The plans will allow impact assessment, effect determinations and mitigation requirements. When executed faithfully, both plans will result in no effect, no adverse effect determinations, will complete cultural resource requirements and will lead to full compliance with historic preservation law and regulations.

Within the project area, at least 29 cultural resource sites from shell middens to towns are present. Over 40 shipwrecks are known, of which 26 are located in the vicinity of Forts Jackson and St. Phillips. The exact locations of many of these sites are unknown.

#### 5.2.9.2. Without Project-Conditions

All the historic and cultural resources sites would remain, but most would continue to degrade.

#### 5.2.9.3. WBRL

Several cultural resource sites would be affected. These include historic Fort Jackson, a 19th century fishing village at Venice, and the Confederate State Ship (CSS) Manassas at Boothville. The effect on the fishing village and the Manassas are problematic. Neither has been evaluated for its National Register Eligibility and their locations are not known with certainty. Visual impacts are minor. The Corps is developing a Research Design for Fort Jackson which, when implemented, in FY 88 will assess the physical impacts and possible mitigation requirements. This should result in a no effect, no adverse effect determination.

#### 5.2.9.4. EBBL

Over 30 sites will be destroyed or severely impacted. These sites include historic cemeteries, small ethnic communities, shipwrecks located in the batture, and Fort St. Phillip. These sites are located within the rights-of-way and borrow areas. The Corps is developing a Research Design for Fort St. Philip which, when implemented before construction of the EBBL, would result in a no effect, no adverse effect determination.

#### 5.2.10. Recreational Resources

##### 5.2.10.1. Existing Conditions

Existing recreational activities in the project area are outdoor oriented and include hunting, fishing, crabbing, boating, water skiing, birdwatching, picnicking, and camping. Refuges in the area include Delta-Breton National Wildlife Refuge (48,834 acres), Bohemia Wildlife Management Area (33,000 acres), and Pass-a-Loutre Waterfowl Management Area (66,000 acres). These areas provide consumptive and nonconsumptive recreational opportunities. Marshes and estuarine water bodies east of the construction area attract sportsmen and outdoor recreationists. The

Mississippi River and its major passes provide limited recreational opportunities due to inaccessibility, size, and current.

The 33,000-acre Bohemia Wildlife Management Area is operated by the Louisiana Department of Wildlife and Fisheries (FDWF) on the Pointe-a-la-Hache Relief Outlet lands, owned by the Orleans Levee Board. The levee board purchased the land in the 1930's to provide a floodway in the event of high river stages. Because the land was never used for the intended purpose, the heirs of the original landowners have claimed title to the land. The dispute is currently in court. The management area is primarily used for recreational hunting; camping is also available during the hunting season. Because of the habitat variety of fresh to brackish marshes, shallow estuaries, batture forest, and levee forest, a diversity of species is available for harvest. These include deer, rabbit, squirrel, dabbling and diving ducks, rails, and snipe. Fishing is also available in the Mississippi River, borrow pits, canals, marshes, and shallow bays.

#### 5.2.10.2. Future Without-Project

Increased demand for recreational public lands is anticipated. The Bohemia Wildlife Management Area would continue to provide opportunities for hunting and fishing, unless the current lease is revoked by the Orleans Levee Board or the area is returned to previous owners or their heirs. Recreational hunting and fishing outside the refuge would continue, but would decline with the loss of woodlands and marsh.

#### 5.2.10.3. WBRL

About 509 acres of batture woodland on the Bohemia Wildlife management area, and 302 acres elsewhere in the project area would be lost which would cause a slight reduction in hunting opportunities within the management area. Most hunting does not occur in the batture area. Although about 577 acres of shallow Mississippi River edges would be deepened, and 4 acres

lost, the impacts are minimal as these areas are seldom used for fishing. About 210 man-days, of recreation opportunities with an annual value of about \$1,500 in 1986 dollars, would be lost annually.

#### 5.2.10.4. EBBL

About 311 acres of woodland on the Bohemia Wildlife management area would be impacted and 617 acres of marsh would be destroyed directly. Hunting opportunities would be lost in these areas. Recreational hunting and fishing opportunities in the area east of the Mississippi River would decline commensurate with wetland degradation and reduction of freshwater and nutrients. About 12,500 man-days of recreational opportunities with an annual value of about \$134,000 in 1986 dollars, would be lost annually.

#### 5.2.11. Water Quality

##### 5.2.11.1. Existing Conditions .

The Louisiana Department of Environmental Quality (LDEQ) has classified the reach of the Mississippi River within the project area as suitable for primary contact recreation, secondary contact recreation, propagation of fish and wildlife, and as a source of raw water for domestic and industrial use. Cities in the project area that draw water from the river for domestic use include Port Sulphur, Pointe-a-la-Hache, and Boothville-Venice. Individual households in some small communities collect and store rainwater in cisterns. At river discharges of less than 230,000 cfs at Tarbert Landing, the water treatment plants are affected by saltwater, which intrudes upstream from the Gulf of Mexico. Treated and partially treated sanitary wastewaters from the large communities and industries are discharged into the river. The quantity of the river water is generally acceptable for its designated uses. However, high concentrations of fecal coliform bacteria, trace metals, and man-made organic compounds often result from sanitary, storm, and process wastewater discharges. The Louisiana State Water Quality Standards, and average

maximum and minimum concentrations of a few select water quality parameters at the Venice and Belle Chasse sampling stations can be found in Table 5.2.5.

#### 5.2.11.2. Future Without-Project

Improvement in the overall water quality of the Mississippi River is anticipated. Some reduction in the concentrations of conventional pollutants (COD, BOD, suspended and dissolved solids, nitrogen and phosphorus), might result from increased efficiencies of upgraded and new wastewater treatment facilities. Efforts toward treatment of urban and industrial stormwaters discharged to the river are not likely to be initiated in the foreseeable future. Beneficial non-quality-dependent uses of the river that can unfavorably impact water quality will continue.

#### 5.2.11.3. WBRL

No long-term water-quality-related impacts are expected due to project implementation. Further, it is anticipated that the duration of construction-related water quality impacts will be short-termed. Bucket dredging would be employed to obtain construction fill from the submerged river bank and batture area of the Mississippi River. Temporary slightly intensified turbidity, elevated suspended particulate concentrations, and moderately depressed dissolved oxygen concentrations are expected to result from excavation of construction material. The placement of dredged material for the levee and wave berm could result in minor, temporary, and localized DO depressions and increased turbidity from erosional runoff during storm events. Minor, short-term impacts, such as increased turbidity, would be associated with operation, maintenance, and repair. A state Water Quality Certificate was applied for in June 1987 (Appendix B).

#### 5.2.11.4. EBBL

Implementation of this plan would require that construction fill be dredged from the area between the river's edge and the existing, subsiding



TABLE 5.2.5

MISSISSIPPI RIVER  
WATER QUALITY PARAMETERS  
(1973 - 1986)

PARAMETER	LSWQS <u>1/</u> <u>2/</u>	BELLE CHASSE STATION			VENICE STATION		
		Av	Max	Min	Av	Max	Min
Chlorides	75	28	74	14	69	1,200	0
Sulfates	120	54	89	27	57	240	29
Dissolved Oxygen	5	8.4	13.2	5.4	8.2	13.8	4.3
Temperature	32	66	88	48	66	91	38
Acidity	6.5-9.0	7.6	8.1	7.2	7.6	8.2	7.2

1/ Louisiana State Water Quality Standards

2/ Mg/l for chlorides, sulfates and dissolved oxygen; °F for temperature;  
pH for acidity

non-federal east-bank levee. Impacts would be the same as those for the WBRL above.

#### 5.2.12. Tax Revenues

##### 5.2.12.1. Existing Conditions

The current poor economic conditions in Plaquemines Parish and the threat of flooding create uncertainty regarding the parish tax base for any given year.

##### 5.2.12.2. Without-Project Conditions

To maintain the current level of flood protection, tax revenues would be needed commensurate with the cost of repairing future flood damages to public facilities and services.

##### 5.2.12.3. WBRL

While Federal and local taxes would be needed for constructing and maintaining the proposed project, improved flood protection could reduce the need for increasing tax revenues in the future. Increased property values should also increase the tax base.

##### 5.2.12.4. EBBL

Impact would be similar to the WBRL Plan.

#### 5.2.13. Property Values

##### 5.2.13.1. Existing Conditions

The limited availability of even marginally protected land and FIA requirements to build at or above the 100-year flowline creates pressures on existing property values. The threat of floods from hurricane surges adds an uncertain dimension to property value trends.

#### 5.2.13.2. Without-Project Condition

The limited amount of protected land in Plaquemines Parish would probably cause increasing pressures on the value of existing development. Periodic flooding and the anticipation of periodic flooding comprise a risk factor which could cause fluctuations in value.

#### 5.2.13.3. WBRL Plan

While potential for damage from hurricane winds would continue, the additional protection this plan offers could improve the stability of property values and increase the dollar value of land within the project area. The high degree of flood protection offered by the project could possibly result in FEMA relaxing its requirements which could have some beneficial effect on property values.

#### 5.2.13.4. EBBL Plan

Impacts would be similar to the WBRL Plan.

#### 5.2.14. Land Use

##### 5.2.14.1. Existing Conditions

Land-use distribution of the western side of the parish includes 460 acres used for residential purposes, 300 acres used for commercial and industrial purposes, 220 acres identified as public and semipublic land, 950 acres of improved pasture and citrus groves, 1,330 acres of woodland, and another 7,140 acres of undeveloped land, unimproved pasture, and lands devoted to transportation, communication and utilities.

##### 5.2.14.2. Without-Project Conditions

Existing trends of limited development on a piece-meal basis within the guidelines of regulatory authorities could continue.

#### 5.2.14.3. WBRL Plan

This plan would generally define the areas to be developed in the future and provide full 100-year protection within the project area.

#### 5.2.14.4. EBBL Plan

Impacts would be similar to the WBRL Plan.

#### 5.2.15. Public Facilities and Services

##### 5.2.15.1. Existing Conditions

Public facilities and services in the project area are threatened by periodic flooding from hurricane induced surges.

##### 5.2.15.2. Without-Project Condition

Current conditions would probably continue, gradually following economic development and area population trends. The cost of maintaining these facilities and services will probably be above average if the area's pattern of hurricane flood damage continues.

##### 5.2.15.3. WBRL Plan

The additional flood protection offered by the project could reduce flood damages to these facilities and aid in maintaining existing services.

##### 5.2.15.4. EEBL Plan

Impacts would be similar to the WBRL Plan.

## 5.2.16. Community and Regional Growth

### 5.2.16.1. Existing Conditions

Plaquemines Parish has experienced limited population growth even while mineral production in the area was very active. The limited availability of land and threat of winds and floods from hurricanes have discouraged growth in the immediate area while mineral production in the parish may have stimulated economic growth in the region. Provisions of the Federal Flood Insurance Act, which specify that residential structures cannot be constructed within the project area unless the first floor elevations are at or above the 100-year flowline may have discouraged residential development in the project area.

### 5.2.16.2. Without-Project Conditions

The limited amount of land available for development and the continued potential for hurricane damage would continue to restrict growth in the area.

### 5.2.16.3. WBRL Plan

The proposed plan could encourage a limited amount of growth in the local communities; the plan is not, however, likely to encourage significant regional growth. The high degree of flood protection provided by the project could possibly result in FEMA reevaluating its requirements which may encourage community growth.

### 5.2.16.4. EBBL Plan

Impacts would be similar to the WBRL Plan.

#### 5.2.17. Employment

##### 5.2.17.1. Existing Conditions

Economic activity in Plaquemines Parish has slowed significantly due to a slump in the oil industry. The area is currently suffering high unemployment.

##### 5.2.17.2. Without-Project Conditions

Employment trends in the area without the project will probably follow business and industrial growth trends. Employment in some industries would be interrupted as periodic hurricane induced flooding occurred.

##### 5.2.17.3. WBRL Plan

Construction activities associated with the project could generate temporary employment in the parish. Intensification and changes in land-use resulting from enhanced hurricane protection could also result in increased employment opportunities.

##### 5.2.17.4. EEBL Plan

Impacts would be similar to the WBRL Plan.

#### 5.2.18. Business and Industrial Activity

##### 5.2.18.1. Existing Conditions

Commercial fishing, and related marine activities make up the areas primary economic base. Mineral production has decreased due to the downturn in the oil industry.

#### 5.2.18.2. Without-Project Condition

The industrial and business activity along the river would probably follow trends of resource production in the area, including minerals and commercial fishery resources. As these resources fluctuate, business and industrial activity would also fluctuate either from resource depletion or from problems caused by hurricane induced surges. Mineral production has slowed significantly due to the oil industry's ailing economy.

#### 5.2.18.3. WBRL Plan

Existing conditions and the effects of a natural depletion of mineral resources in the area over the 100-year protect-life would occur. The disruption caused by hurricane induced storm surges would be significantly reduced, encouraging further economic development in the short term as well as stabilizing conditions that currently threaten existing business and industrial development and discourage expansion in the area.

#### 5.2.18.4. EBBL Plan

Impacts would be similar to the WBRL Plan.

### 5.2.19. Agricultural Lands/Displacement of Farms

#### 5.2.19.1. Existing Conditions

Agricultural land in the protected project area totals approximately 950 acres, including pastureland and citrus groves. An estimated 4,000 head of cattle were drowned in Plaquemines Parish as a result of Hurricane Camille in 1969. Farmland and undeveloped land available for agricultural pursuits in lower Plaquemines Parish are classified as Prime and Unique Farmlands by the U.S. Soil Conservation Service.

#### 5.2.19.2. Without-Project Conditions

If the project is not constructed, continued periodic flooding would continue over some of the 950 acres of orange groves and improved pasture.

#### 5.2.19.3. WBRL Plan

With the levee system in place, land currently used for agricultural production would receive additional flood protection. The long term benefits could add stability to the productivity levels of existing crop and pasture lands or it could encourage the conversion of farm land to higher economic uses. Construction of the WBRL Plan would result in the loss of about 34 acres of farmland which are primarily pasture, citrus crops or row crops. About 25 acres of wooded sites suitable for clearing are available within the protected area, and would also be impacted by construction.

#### 5.2.19.4. EEBL Plan

Impacts would be similar to the WBRL Plan, however, no farmland or potential farmland would be directly impacted.

#### 5.2.20. Relocations

##### 5.2.20.2. Without-Project Condition

Without the project, continued periodic flooding would force temporary relocations to areas less prone to flooding.

##### 5.2.20.3. WBRL Plan

About 15 houses and 25 trailers would be permanently relocated with construction of the WBRL plan. Temporary relocations associated with current flood threats would be greatly reduced.



#### 5. 2. 20. 4. EBBL Plan

No relocations required.

#### 5. 2. 21. Flood Control

##### 5. 2. 21. 1. Existing Conditions

Historically, land development along the Lower Mississippi River involved the construction of levees; drainage was accomplished by using a system of pumps. Local officials recognize these procedures as a trade-off, balancing the needs for hurricane protection and land development against reducing a certain amount of the adjacent wetlands, considered as valuable resources. While wetlands in Plaquemines Parish are experiencing a decline, they make up a majority of the land resources in the Parish relative to the narrow strip of land located along the banks of the river.

##### 5. 2. 21. 2. Without-Project Condition

The passage of two major hurricanes in 1965 and 1969 through the project area have been followed by assessments of the relationship between the value of damaged structures and their contents, and the depth of flooding above floor elevations. Based on these studies, determinations have been made of projected damage and the benefits of reducing future damages through increased protection. Without this additional protection, a continuation of hurricane induced surges and damages is likely to occur.

##### 5. 2. 21. 3. WBRL Plan

The improved levee system is expected to reduce flood damages from storm surges.

#### 5.2.21.4. EBBL Plan

Impacts would be essentially the same as the WBRL Plan.

#### 5.2.22. Noise

##### 5.2.22.1. Existing Conditions

Noise is generated by the agricultural developments and industrial plants scattered along the river; however, no objectionable levels have been reported in conjunction with recent studies.

##### 5.2.22.2. Without-Project Condition

Noise levels would remain about the same.

##### 5.2.22.3. WBRL Plan

During construction, heavy equipment would be operating on the levee, and would produce sound levels of about 107 decibels (dBA). Residences or businesses near the work site would be exposed to noise at various levels and time durations depending on the distance from the sound source. The approximate number of structures, maximum sound level, exposure time, and distance from the construction area are shown in Table 5.2.6. Noise would be expected to be annoying to the inhabitants of structures within 400 feet of the actual work site. EPA has a limit of 85 dBA for eight hours of continuous exposure to protect against permanent hearing loss. Although noise levels near the construction site would exceed this threshold, the levels would be intermittent during the day. Trees, shrubs, buildings, etc., would attenuate the noise level. No hearing impairments would be expected.

Socioeconomic activity stimulated by improved flood protection could create additional noise; however, no increases to dangerous levels are anticipated.

TABLE 5.2.6  
NOISE EXPOSURE

DISTANCE (feet)	BUILDINGS (number)	NOISE EXPOSURE			
		(Days)			
		<u>a/</u>			
		102-107	106-102	90-96	84-90
0-50	50	3.6	3.8	7.0	15.6
50-100	117	-	5.7	9.0	15.3
100-200	198	-	-	11.7	16.4
200-400	290	-	-	-	23.4

a/ Decibels (dBA)

#### 5.2.22.4. EBBL Plan

No adverse noise impacts would be expected.

#### 5.2.23. Population

##### 5.2.23.1. Existing Conditions

Based on 1980 census figures the resident population of west-bank protected area total approximately 12,400, which is about the same as the 1970 figure. The area is essentially rural, with several small communities scattered along Louisiana Highway 23.

##### 5.2.23.2. Without-Project Conditions

Table 5.2.5. indicates historical and projected population increases.

##### 5.2.23.3. WBRL Plan

Improved protection against flooding within the project area could encourage additional economic development, employment, and increase population in the area.

##### 5.2.23.4. EEBL Plan

Impacts would be similar to the WBRL Plan.

#### 5.2.24. Esthetic Values

##### 5.2.24.1. Existing Conditions

The primary esthetic values of lower Plaquemines Parish are generally considered its rustic landscape and environment.

Table 5.2.7  
POPULATION PROJECTIONS

AREA	YEAR						
	1950 <sup>1</sup>	1960 <sup>1</sup>	1970 <sup>1</sup>	1980 <sup>1</sup>	1993 <sup>2</sup>	2000 <sup>2</sup>	2030 <sup>2</sup>
Plaquemines Parish	14,239	22,545	25,225	26,049	27,083	28,438	33,028
Ward 3	-	-	6,414	7,220	-	-	-
Ward 4	-	-	7,084	5,656	-	-	-
Project Area				12,400	13,100	14,000	16,900

<sup>1</sup>/ Bureau of the Census (actual)

<sup>2</sup>/ NOD estimates based on OBERS BEA Regional Projections for the non-SMSA portion of Economic Area 113 (New Orleans).

#### 5.2.24.2. Without-Project Conditions

The natural wildlife environment which, many feel, makes up the primary esthetic quality of the area would probably continue to decline as economic developments expand without regard to esthetics. Periodic flood and hurricane damage would also cause negative impacts to the esthetics of the area.

#### 5.2.24.3. WBRL Plan

Economic expansion could result in further intrusion into esthetic values of the natural wildlife environment, however, improved flood protection could prevent damage and disruption to man-made developments.

#### 5.2.24.4. EBBL Plan

Impacts would be similar to the WBRL Plan.

#### 5.2.25. Community Cohesion

##### 5.2.25.1. Existing Conditions

The project is supported by local government officials.

##### 5.2.25.2. Without-Project Conditions

Local interests would probably continue their support for improved hurricane surge flood protection along the west bank.

##### 5.2.25.3. WBRL Plan

No adverse impacts to the structure of local community are anticipated. The project may actually enhance cohesion by providing hurricane protection.

##### 5.2.25.4. EBBL

Same as the WBRL Plan.

# 5. LIST OF PERSONNEL

The following people were primarily responsible for preparing the following comments on impact statements:

NAME	DISCIPLINE EMPLOYING	EXPERIENCE	ROLE IN PREPARING EIS
Mr. Carl E. Anderson	Engineer Civil Engineer	5 years, Engineering Division, Bureau of Engineers, New Orleans District	Project Manager
Mr. Howard R. Bush	Recreation Resource Management Officer Recreation Planning	5 years, Senior Recreation Planner, Bureau of Engineers, New Orleans District, 3 years, Senior Recreation Planner, Department of Planning, State of Arkansas	Review
Mr. Jim Chase	Archaeologist/Anthropologist	10 years, Archaeologist, Corps of Engineers, New Orleans District, 20 years, Archaeologist, Federal Bureau	Effects on Cultural Resources
Mr. E. Scott Clark	Wildlife Management Anthropologist	5 years, EIS Studies, Corps of Engineers, New Orleans District	EIS Coordinator Effects on Wildlife Resources
Mr. Nicholas G. Conster	Economist/Economics	2 years, Chief Economist, New Orleans District, 15 years, Economist, New Orleans District	Review
Mr. Stephen C. Finnegan	Recreation Resource Management Officer Recreation Planning	5 years, Landscape Architect, New Orleans District, 1 year, Landscape Architect/Planner, Jefferson Parish,	Effects on Recreational Resources
Ms. Jessica M. Fox	Economist/Economics	5 years, Economic Studies, Corps of Engineers, New Orleans District	Economic Effects

# CV. LIST OF PERSONNEL (Continued)

The following people were primarily responsible for preparing this Environmental Impact Statement.

NAME	EDUCATION EXPERIENCE	EXPERIENCE	ROLL IN PREPARING EIS
Mrs. Suzanne Weiss	Biology Botany	14 years, EIS studies, New Orleans District	Review
Mr. Blinford C. Johnson	English/Technical Writing and Editing	15 years, Technical Writer/Editor, Corps of Engineers, New Orleans District.	Editing
Mr. Robert Lucy	Economist/Economics	14 years, Economic Studies, Corps of Engineers, New Orleans	Social/Economic Effects
Mr. James E. Warren	Engineer/Environmental Engineer	7 years, Environmental Engineer, Corps of Engineers, New Orleans District	Effects on Water Quality
Mr. John C. Weber	General Biology Zoology	15 years, Environmental Planning and Regulatory Functions, New Orleans District	Review



## **7. PUBLIC INVOLVEMENT**

### **7.1. PUBLIC INVOLVEMENT PROGRAM**

A public meeting was held March 13, 1986 in New Orleans, Louisiana, to discuss the views of local interests concerning hurricane flooding and protection. Coordination was maintained throughout the study with other agencies and interested parties. These include the U.S. Fish and Wildlife Service, the U.S. Environmental Protection Agency, the National Marine Fisheries Service, and the Louisiana Department of Wildlife and Fisheries. Coordination was also maintained through correspondence and informal meetings with local interests. On November 30, 1984, and January 10, 1985, public meetings were conducted by the Plaquemines Parish Commission Council to receive public input on the A and B reaches of the project.

On January 29, 1986, the EBBL and WBRL alternatives were discussed with Federal and state natural resource agencies to acquaint them with the project's features. A Public Notice regarding the proposed work was distributed to the general public on February 24, 1986, and Notice of Intent to prepare an EIS was printed in the Federal Register on March 4, 1986. A public scoping workshop was conducted in Buras, Louisiana, on March 18, 1986, and was attended by 101 registered participants. On September 26, 1986, a follow-up document was distributed to those who attended the workshop and other interested persons.

### **7.2. REQUIRED COORDINATION**

Circulation of this Draft EIS accomplishes the required coordination with the appropriate Federal, state, and local agencies, organizations, and individuals.

### **7.3. STATEMENT RECIPIENTS**

The agencies or persons listed below received copies of the Draft EIS.

#### **MEMBERS OF CONGRESS**

Honorable J. Bennett Johnston  
Honorable John B. Breaux  
Honorable Lindy C. Boggs  
Honorable Robert L. Livingston  
Honorable Billy Tauzin

#### **FEDERAL AGENCIES**

Department of the Interior, Office of Environmental Project Review  
Environmental Protection Agency, Regional EIS Coordinator, Region VI  
Environmental Protection Agency, the Administrator  
Department of Commerce, Joyce M. Wood, Director, Office of Ecology and Conservation  
Department of Commerce, National Oceanic & Atmospheric Administration, National Marine Fisheries Service, Southeast Region  
Department of Agriculture, Washington, D.C.  
Department of Agriculture, Southern Region, Regional Forester, Forest Service  
Department of Energy, Division of NEPA Affairs, Washington, D.C.  
Federal Emergency Management Administration, Washington, D.C.  
Department of Transportation, Deputy Director for Environmental and Policy Review  
Federal Highway Administration, Division Administrator  
Department of Health and Human Services, Washington, D.C.  
Department of Housing and Urban Development, Regional Administrator, Region VI  
Advisory Council on Historic Preservation, Washington, D.C.  
Advisory Council on Historic Preservation, Golden, CO

## STATE AGENCIES

Louisiana Department of Health and Human Resources, Office of Health Services and Environmental Quality

Louisiana Department of Transportation and Development, Office of Public Works, Deputy Chief Engineer

Louisiana Department of Wildlife and Fisheries, Secretary

Louisiana Department of Natural Resources, Division of State Lands,

Louisiana Department of Commerce, Research Division, Mrs. Nancy P. Jensen

Louisiana Department of Culture, Recreation, and Tourism, State Historic Preservation Officer

Louisiana Department of Culture, Recreation, and Tourism, Office of State Parks

Louisiana Department of Natural Resources, Office of Environmental Affairs

Louisiana Department of Natural Resources, Office of Forestry

Louisiana State Planning Office, Ms. Joy Bartholomew, Policy Planner

Louisiana State University Center for Wetland Resources,  
Dr. Jack R. Van Lopik

Louisiana State University, Department of Geography and Anthropology,  
Curator of Anthropology

Louisiana Collection Library, University of New Orleans

Louisiana State University, Coastal Studies Institute, Library

Governors Coastal Protection Task Force

## LOCAL

President, Plaquemines Parish Commission Council

President, St. Bernard Parish Police Jury

## **ENVIRONMENTAL**

Ecology Center of Louisiana, Inc., J. Vincent, President

Orleans Audubon Society, Mr. Barry Kohl

Environmental Defense Fund

Sierra Club

Plaquemines Soil and Water Conservation District

## **INDIVIDUALS**

Oliver Houck

George Pivach

J. Sanchez

Benj. Slater, Jr.

## **7.4. PUBLIC VIEWS AND RESPONSES**

7.4.1. The potential effects of the East-bank Barrier Levee on wetlands and means to mitigate these impacts were major concerns expressed by both the public and resource agencies. Because the EBBL would be constructed on one of the last remaining functional alluvial levees in Louisiana, natural overbank flooding of the Mississippi River would be virtually eliminated along the entire length of the lower river. Termination of the overbank flooding would result in the loss of sediment, nutrients, and freshwater recharge and the subsequent increase in subsidence and saltwater intrusion. All these conditions act in a synergistic manner which would rapidly accelerate marsh losses in an area of accreting wetlands. The EBBL plan has incorporated freshwater diversion structures to alleviate some of these impacts. The loss of mid- to late-successional bottomland hardwoods, particularly those within the Bohemia Wildlife Management Area, were of concern. This was because the area is one of the few remaining stands of unleveed natural alluvial forest, and most of the forest is within a wildlife management area. The EBBL plan would directly and indirectly impact much of this area. All the late and most mid-successional forest

with the WBRL plan was deleted from consideration at the request of the Louisiana Department of Wildlife and Fisheries and the USFWS.

Mitigation of project associated impacts is of concern, particularly for the EBBL plan which would eliminate the overflow of freshwater and sediments. Construction of the diversion structure would ameliorate the freshwater problem, but the loss of sediment would be difficult to mitigate. Mitigation of the WBRL primarily involves the replacement of early- to mid-successional bottomland hardwood habitat losses.

The natural resource agencies would prefer the EIS and mitigation report be distributed as one document. The preparation of a single document would be preferable, and is generally the accepted procedure. Unfortunately, the preparation of two documents is necessary because of the immediate need for hurricane protection and to expedite the EIS process. The mitigation report is currently in preparation.

7.4.2 Residents of the protected area are concerned with the impact hurricane protection would have on the Federal Emergency Management Agency's (FEMA) flood insurance program, especially on ground floor elevations, and insurance availability and rates. FEMA has been provided information on the residents' concerns and will be provided a copy of this document for their review and comments. Many of the flood insurance issues presented are related to FEMA policy and are beyond the scope of this document or the Corps' control.

#### **7.5. RESPONSE TO USFWS RECOMMENDATIONS**

A Draft Fish and Wildlife Coordination Act Report (CAR) was provided by the U.S. Fish and Wildlife Service (FWS) in June 1987. The CAR, (Public Law 85-624 of 12 August 1958) provides that fish and wildlife conservation receive equal consideration and coordination with other project purposes. The Act also indicates the Department of the Interior will provide recommendations for wildlife conservation and development, and the reporting agency will give consideration to those recommendations. The FWS provided

nine recommendations, which are listed and responded to in Table 7.1. The Final CAR for the project will be included in the Final EIS.

The USFWS Coordination Act Report (FWCAR) found in Appendix A evaluates both Reach C and the WBRL impacts. A consolidated report was prepared by the USFWS to avoid duplication and provide one document to evaluate mitigation needs. The mitigation report, to be prepared in conjunction with the WBRL work, will also include Reach C impacts. The Reach C impacts were assessed in the original FEIS and subsequent Environmental Assessments.

TABLE 7.1  
USFWS RECOMMENDATIONS & RESPONSES

RECOMMENDATION	RESPONSE
1. The least environmentally damaging reasonable alternative, i.e., the use of open, non-wetland sites for borrow materials, should be implemented. This action would eliminate the need for additional mitigation and is the only alternative that would fulfill the planning objective.	Because the WBRL plan would require over 6 million cubic yards of material, the use of only non-wetland sites is not practical. Environmental impacts have been reduced as much as possible by using low habitat quality batture lands and Mississippi River bottoms for borrow.
2. Impacts to wooded batture lands should be minimized by excavating deeper borrow pits with a smaller surface area and by separation of the pits from the river channel by preserving a strip of forested land.	2. The WBRL borrow pits are to be excavated to a depth of -15 feet. Any further continuous deepening could impact river hydraulics and sedimentation patterns. Because borrow material is to be removed from both the river and batture area, leaving a strip of forested land is not possible.
3. All borrow pits should be backfilled with material dredged from the Mississippi River channel (possibly in conjunction with ongoing construction of the other project reaches) to facilitate revegetation. Backfilled pits should be planted with bottomland hardwood species where conditions would be conducive to their growth.	3. The backfilling of the WBRL borrow pits is not a project feature. The use of dredged material from other work, and revegetation of the site, would be given consideration in the event dredging is conducted in the project vicinity.
4. Unavoidable impacts to Resource Category 2 bottom land hardwood habitat should be compensated in-kind via planting of existing open lands and preservation of an existing tract of bottomland hardwoods threatened by future development.	4. These recommendations will be addressed in a mitigation report to be prepared in conjunction with the Barriers EIS.
5. Unavoidable losses of Resource Category 2 marsh should be compensated via excavation of crevasses or construction of sediment fences to create marsh in the active Mississippi River delta.	5. Reference item 4 above

TABLE 7.1  
USFWS RECOMMENDATIONS & RESPONSES

RECOMMENDATION	RESPONSE
6. Unavoidable losses to Resources (Category 3) habitat should be compensated through creation of additional forested and/or marsh habitat via the above-cited methods or by preservation of existing forested land.	6. Reference item 4 above
7. Mitigation features should be implemented simultaneously with other project features.	7. Mitigation would be accomplished prior to project completion.
8. The initial development, replacement, and annual operation and maintenance costs for the mitigation features shall be borne as an integral project expense.	8. Reference item 4 above
9. Detailed design of the hurricane protection and mitigation features shall be coordinated with the Fish and Wildlife Services and other interested natural resource agencies.	9. These features would be in coordination with the appropriate resource agency.



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NEW ORLEANS TO VENICE LOUISIANA HURRICANE PROTECTION  
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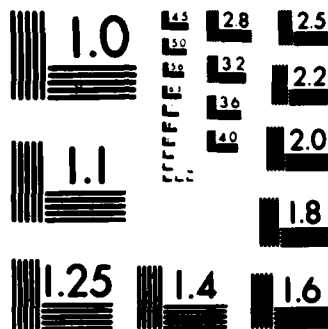
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